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TABLE OF CONTENTS

On Some Japygidæ in the Museum of Comparative Zoölogy (Dicellura). *F. Silvestri* 209
Some American Syrphid Flies. *F. M. Hull* 230
Two New Tiger Beetles from New Guinea. *P. J. Darlington, Jr.* 241
Insect Reconnaissance in Liberia, West Africa. *M. S. Briscoe* 246
A New Genus and Species of Damselfly from Southern Haiti (Odonata). *K. A. Christiansen* 256
Note on the Type Specimen of *Bagous sellatus* Leconte (Coleoptera: Curculionidæ). *F. G. Werner* 262
A New *Stictoponera*, with Notes on the Genus (Hymenoptera: Formicidæ). *W. L. Brown, Jr.* 263
The Habitat of *Ænigmatias* (Diptera: Phoridæ). *C. T. Brues* 265
Some Characters in the Perlidæ. *N. Banks* 266
Index to Volume 54 293

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# PSYCHE

VOL. 54 DECEMBER, 1947 No. 4

# ON SOME JAPYGIDÆ IN THE MUSEUM OF COMPARATIVE ZOÖLOGY (DICELLURA)[1]

BY F. SILVESTRI
Laboratorio di Entomologia Agraria, Portici, Italy

During my last visit to Harvard University, at the Tercentenary Celebration (1936), I received a small collection of Japygidæ from the Museum of Comparative Zoölogy. Study of this material shows that the collection includes:

1) Specimens of *J. subterraneus* Packard, which I think worthy of redescription in order to fix the characters of this species, the first japygid described from the United States.
2) *Metajapyx confectus* sp. n. from Washington, District of Columbia.
3) *Evalljapyx sonoranus* Silv., which is redescribed after comparison with the type from Arizona.
4) *Evalljapyx dispar* sp. n., from Santa Cruz Island, California.
5) *Evalljapyx darlingtoni* sp. n., from Jamaica.
6) *Japygianus wheeleri* gen. n. et sp. n., from Queensland, Australia.

### *Metajapyx subterraneus* (Pack.)

Text-fig. 1; plate 17, fig. 1.

*Japyx subterraneus* Packard, Amer. Natur., 8 (1874), p. 501, fig.; MacGillivray, Can. Ent. 25 (1893), p. 173; Packard, Amer. Natur. (1886), p. 382.

? *Japyx multidens* O. F. Cook, Proc. ent. soc. Washington 4 (1899), p. 225.

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[1] Published with a grant from the Museum of Comparative Zoölogy at Harvard College.

♀ Corpus cremeum abdomine a segmento sexto gradatim ferrugineo, forcipis marginibus et apice nigrescentibus.

Caput supra setis c. 15 + 15 brevibus et parum longis (ad mm. 0.156) et seta nonnulla brevissima instructum; antennæ 32-articulatæ, articulo tertio subæque longo atque lato, setis majoribus ad mm. 0.185 longis, articulorum ceterorum setis et sensillis vide fig. 1 (1–2); maxillæ primi paris laminis pectinatis 5; palpus labialis mm. 0.065 longus, subconicus setis apicalibus quam palpus parum longioribus, submento macrochætis posticis eiusdem dimidia latitudo haud attingentibus.

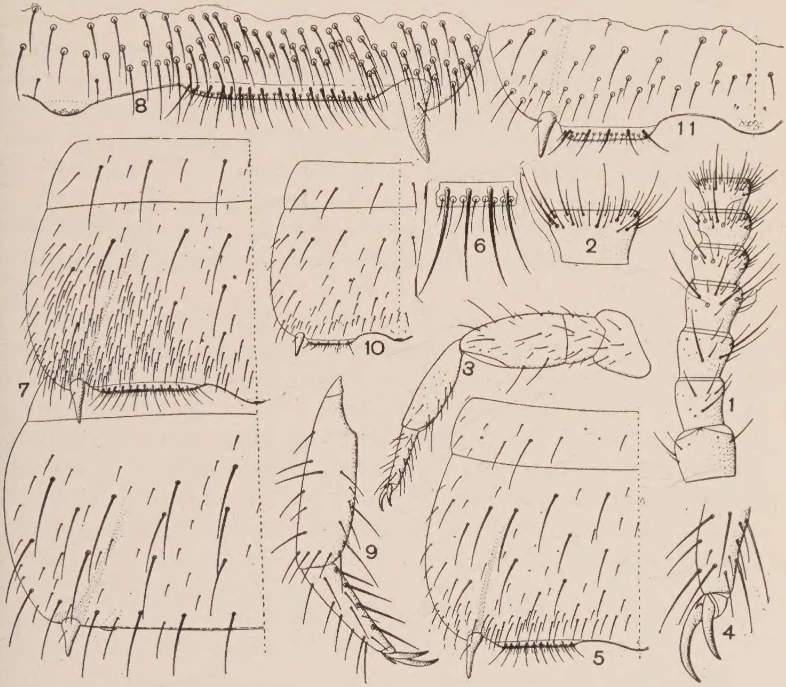
Thorax. Pronotum setis longis 5 + 5, quarum laterales aliquantum longiores (mm. 0.20 longæ) et seta nonnulla minima; meso- et meta-notum præscuto setis duabus submedianis brevibus et setis duabus brevissimis, scuto setis 7 + 7 longis et sat longis et nonnullis brevibus et brevioribus instructum; sterna setis nonnullis brevibus, brevioribus et brevissimis.

Pedes facie externa præsertim setosa, tibiæ seta infera apicali tarsi dimidiam longitudinem fere attingente, tarso quam prætarsus quadruplo longiore, infra seriebus duabus setarum 4, quam ceteræ robustioribus et aliquantum longioribus, prætarsi unguicula bene evoluta et ungue postico quam anticus aliquantum longiore.

Abdomen. Tergita $3^{um}$ ad $7^{um}$ setis duabus anticis submedianis brevibus, setis 5 + 5 sat longis, setis brevioribus nonnullis et setis brevissimis sat numerosis instructa; tergitum sextum quam quintum parum (parum minus quam $\frac{1}{8}$) latius angulo postico obtuso, sextum angulo postico vix acute producto, septimum angulo postico subacuto latiusculo retrorsum c. mm. 0.130, octavum quam septimum parum longius et fere $\frac{1}{4}$ angustius, angulo laterali postico vix producto.

Urosternum primum organis subcoxalibus quartam partem marginis posticis inter stilos subæquantibus, setis brevibus 14 uniseriatis et setis brevissimis glandularibus contiguis posticis uniseriatis instructis, organo glandulari mediano disculis 9 contiguis composito; urosterni superficie ante organa subcoxalia setis sat numerosis brevibus transverse irregulariter 2–3 dispositis, ante organum medium setis minimis 1 + 1, superficie cetera setis nonnullis sat longis transverse 4-seriatis et setis brevioribus sparsis parum numerosis; stilis et vesiculis consuetis.

Segmentum ultimum supra mensum subæque longum atque latium setis sat longis 5 + 5, seta nonnulla breviore et setis minimis sat numerosis, carinis sublateralibus subintegris, acropygio brevissimo, latiusculo, late rotundato.



Text-fig. 1. *Metajapyx subterraneus:* 1. antennæ dexteræ articuli $1^{us}$ ad $7^{um}$ super inspecti; 2. eiusdem antennæ articulus $10^{us}$ magis ampliatus; 3. pes paris tertii (setis nonnullis punctis indicatis abruptis); 4. eiusdem pedis tarsi apex et prætarsus a facie antica inspecti; 5. feminæ urosternum $1^{um}$; 6 eiusdem urosterni organi subcoxalis particula multo ampliata; 7. maris urosterna $1^{um}$ et $2^{um}$; 8. maris urosterni $1^{i}$ pars postica magis ampliata; 9. larvæ 3æ ætatis pedis postici tibia, tarsus et prætarsus; 10. eiusdem larvæ urosternum $1^{um}$; 11. eiusdem urosterni pars postica magis ampliata (figg. varie ampliatæ).

Forceps segmenti decimi longitudinem dorsualem æquans, brachio dextero dente majore ad apicem tertiæ partis proximalis marginis interni sito, margine prædentali denticulis 4 uniseriatis, margine postdentali toto gradatim minus profunde crenulato, brachio lævo dente majore submediano, margine prædentali denticulis perparvis biseriatis 10/9, margine postdentali vix crenulato.

Long. corporis mm. 7; lat. urotergiti septimi 1.05, long. antennarum 2.50.

♂ Exemplum examinatum statura paullum majore (ad mm. 8, lat. urotergiti septimi 1.23) differt præsertim urosterno primo, quod organis subcoxalibus latioribus et urosterni superficie ante organa subcoxalia area subtriangulari, lato majore postico, fere ad præsternum externe extensa setis sat longis pernumerosis ut fig. 1 (7–8) demonstrat instructa; forcipis brachio dextero ante seriem prædentalem denticulorum 4 denticulo quinto parvo aucto.

*Habitat.* In the collection of the Museum of Comparative Zoölogy I have found 3 specimens with the label "*Japyx subterraneus,* Packard compared with type A.S.P." from S. Ohio, Nov. 1874; from these specimens I have selected the female and the male here described. In the same Museum I have seen a specimen also labeled *Japyx subterraneus* from Lee Co., Va. (July 1879 Hubbard). It agrees in the above characters with the specimens from Ohio.

### **Metajapyx confectus** sp. n.

Text-fig. 2; plate 17, fig. 2

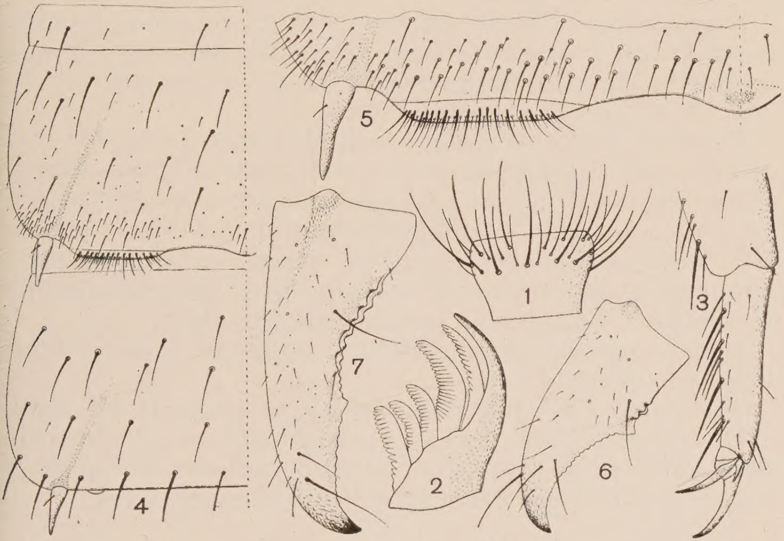
♀ Corpus ochroleucum ab abdominis segmento septimo ferrugineo-latericio, forcipis apice et marginibus nigris.

Caput supra setis sat longis (mm. 0.156) c. 15 + 15 et seta nonnulla breviore et setis brevissimis parum numerosis instructum; antennæ 32-articulatæ, articulo tertio setis majoribus mm. 0.24 longis, articulis ceteris etiam setis et sensillis speciei præcedentis similibus; maxillæ primi paris lobo interno laminis pectinatis 5 (prima inclusa).

Thorax. Pronotum setis 6 + 6, quarum longiores mm.

0.260 longæ sunt; meso- et metanotum setis sat longis 7–7 et nonnullis brevioribus et brevissimis (in exemplis asservatis fere omnibus abruptis); sterna setis paucis brevibus et brevioribus instructa.

Pedes setosuli, tibia quam tarsus fere $\frac{1}{3}$ longiore, seta apicali quam tarsus $\frac{3}{5}$ breviore, prætarsi ungue postico quam anticus $\frac{1}{4}$ longiore.



Text-fig. 2. *Metajapyx confectus:* 1. antennæ dexteræ articulus $16^{us}$ multo ampliatus; 2. maxilla primi paris lobus internus; 3. pedis postici tibiæ apex, tarsus et prætarus; 4. urosterna $1^{um}$ et $2^{um}$; 5. eiusdem urosterni pars postica magis ampliata; 6. forcipis brachium dexterum supinum; 7. forcipis brachium lævum pronum (figg. varie ampliatæ).

Abdomen. Tergita 3–7 setis sat longis 5 + 5, setis duabus subanticis submedianis brevibus et seta nonnulla breviora instructa; tergitum sextum quam quintum vix latius, angulo postico retrorsum vix producto, tergitum septimum angulo postico acuto, retrorsum c. mm. 0.170 producto, tergitum octavum longitudine septimo subæquali, parum fere $\frac{1}{4}$ angustiore.

Urosternum primum organis subcoxalibus latitudine fere quartam partem marginis posticis inter stilos æquans setis brevibus c. 20 et setis brevissimis glandularibus posticis uniseriatis, organo glandulari mediano disculis c. 19, urosterni superficie ante organa subcoxalia setis brevibus numerosis transverse et irregulariter 3–4 seriatis dimidium versus gradatim minus numerosis, ante organum medianum setis duabus brevioribus submedianis et setis duabus ante dictas brevibus; urosterni superficie cetera setis nonnullis parum longis transverse 4-seriatis et setis paucis brevioribus et brevibus.

Segmentum ultimum supra mensum paullum longius quam latius, superficie supera setis satis sat longis 5 + 5, carinis sublateralibus bene distinctis, acropygio latiusculo, brevissimo, late rotundato.

Forceps segmenti decimi latitudinem æquans, brachio dextero dente majore robusto acuto multo præmediano, tuberculis prædentalibus 4, quorum 1 superum et 3 infera sunt ($\frac{1}{3}$), margine postdentali paullum profunde crenulato, brachio lævo dente majore quam dexterus minore, aliquantum post-mediano, margine prædentali denticulis biseriatis 6/10, margine postdentali crenulato.

Long. corporis ad mm. 10; lat. segmenti septimi 1.20; long. antennarum 2.50.

*Habitat.* Exempla vidi 5 ad Washington, D. C., lecta.

Observatio. Species hæc a præcedente forcipis brachio dextero parte proximali (prædentali) tuberculo supero et tuberculis 3 inferis armato facile distinguenda est.

### *Evalljapyx sonoranus* Silv.

Text-fig. 3; plate 18, fig. 1

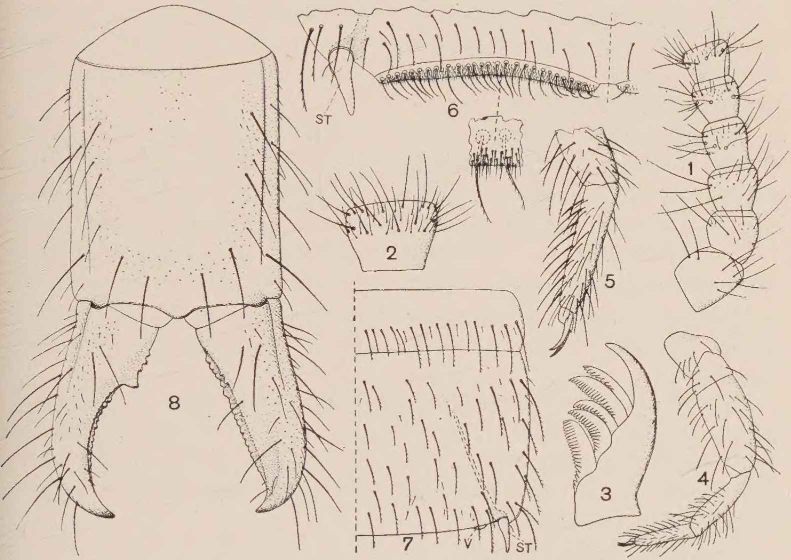
?*Japyx hubbardi* O. F. Cook, Proc. ent. soc. Washington 4 (1899), p. 225, Pl. I, fig. 2a–2b; Swenk, J. New York ent. soc. 11 (1903), p. 130.

*Evalljapyx sonoranus* Silv., Boll. Lab. Zool. Gen. Agr. Portici, 5 (1910), pp. 76, 77–78, fig. 4.

Corpus cremeum abdomine a segmento 6° gradatim obscuriore, ferrugineo, forcipe badio lateribus et apice brunneis. Corporis setæ majores omnes parte distali breviter, unilateraliter plumatæ.

Caput supra setis c. 18 + 18, mm. 0.20 longis, et setis magis numerosis sparsis brevioribus instructum; antennæ 30-articulatæ (articulis penultimo) et ultimo inter sese male distinctis, articulo 3° parum ad apicem latiore quam longiore, seta dorsuali longiore mm. 0.28 longa, articulorum ceterorum setis et sensillis vide fig. 3 (1–2); maxillæ 1ⁱ paris laminis pectinatis 5; palpus labialis mm. 0.10 longus.

Thorax. Pronotum setis 10 + 10 longiusculis (majoribus ad mm. 0.28) et setis paucis brevioribus instructum; meso- et metanotum præscuto setis longiusculis 1 + 1 vel 2 + 2 (in metanoto) et setis pronoti similibus et aliquantum magis numerosis; sterna setis longiusculis numerosis et nonnullis brevioribus instructa.



Text-fig. 3. ***Evalljapyx sonoranus:*** 1. antennæ lævæ articuli 1^us^ ad 6^um^ supra inspecti; 2. eiusdem antennæ articulus 14^us^ multo ampliatus; 3. maxilla 1ⁱ paris lobus înternus; 4. pes paris 3ⁱ; 5. eiusdem pedis tibiæ apex, tarsus et prætarsus magis ampliati; 6. urosterni primi pars postica organo subcoxali retracto multo ampliata; 7. urosternum 3^um^; 8. exempli alterius uritum decimum cum forcipe (figg. varie ampliatæ).

Pedes setosuli, tarso quam tibia aliquantum breviore setis inferis biseriatis (8 + 8), seta dorsuali subapicali unguis externi dimidiam longitudinem parum superante, prætarsi unguibus parum arcuatis, ungue externo quam internus parum breviore.

Abdomen tergitis 1° ad 6um setis longiusculis c. 18 + 18 præsertim sublateralibus et lateralibus et setis brevioribus et minimis sparsis, tergito 7° margine laterali late rotundato, margine postico quam mesotergiti angulis lateralis rotundatim vix producto paullum breviore et subrotundato, setis tergito sexto subsimili; tergito 8° parum latiore quam longiore, angulis posticis haud productis, superficie setis minimis numerosis et macrochætis 1 + 1 submedianis subanticis brevibus, submedianis subposticis 1 + 1 quam subanticæ parum longioribus et sublateralibus et lateralibus (utrimque 5) subæqualibus, tergito 9° brevissimo.

Urosternum primum organis subcoxalibus latis, urosterni partem medianam angustiorem haud occupantibus, setis pernumerosis minimis glandularibus 4–6 crebre seriatis et serie postica ventrali setis sensitivis brevibus c. 25–30 constituta, vix barbatis ad mm. 0.04 longis, superficie cetera per præsternum et coxosternum setis numerosis brevibus, breviter plumatis ut urosterna sequentia (Fig. 3) instructa nec non setis nonnullis brevissimis sparsis.

Segmentum ultimum, supra mensum fere $\frac{1}{4}$ longius quam latius, lateribus parallelis, superficie supera lineis duabus sublateralibus antice et postice abbreviatis, macrochætis c. 12 + 12 et setis minimis sparsis, acropygio brevissimo rotundato.

Forceps quam segmenti 10i longitudo c. $\frac{1}{4}$ brevior brachiis robustis: dextero crasso, lato, parum longe ab apice tantum profunde sinuoso, apice arcuato acuto, dente destituto et pro dente sinu minimo affecto denticulis superis proximalibus 2, cetero margine inter basim et sinum apicalem toto denticulato, denticulis c. 20–25 uniseriatis; brachio lævo dente proximali magno acuto, denticulis prædentalibus 5 uniseriatis et postdentalibus uniseriatis, gradatim minoribus, c. 10.

Long. corporis ad mm. 12; lat. urotergiti 7i 1.34; long. antennarum 2.20.

In exemplo alio femineo, statura vix minore, abdominis segmentum 10um angustius est et forcipis brachium dexterum parum longiore margine interno postmediano minus lato, brachio lævo dentibus prædentalibus tantum 3.

*Habitat.* Exempla hic descripta super Montem Lemmon (Santa Catalina Montes), Arizona, inter 8000 et 9150 ft., July 26, 1917, lecta fuerunt; exemplum mm. 8 longum etiam vidi ad Oracle Springs, Arizona, March, lectum; exempla typica in agro ad Tucson, Arizona, legi.

### *Evalljapyx dispar* Silv.

Text-fig. 4; plate 18, fig. 2

Syn. *Evalljapyx propinquus* Silv. partim (exemplum ex Monterey)

♀ Corpus ochroleucum ab urito 7° badio-ferrugineum forcipis marginibus parum obscurioribus; setis omnibus majoribus brevissima plumatis.

Caput setis longiusculis (ad mm. 0.20) c. 15 + 15 supra instructum; antennis 27-articulatis, articuli 3$^{i}$ seta sublaterali supera ad mm. 0.20 longa.

Thorax. Pronotum setis 7 + 7 longiusculis, quarum sublateralis, transverse submediana, aliquantum longior (ad mm. 0.30 longa); meso- et metanotum præscuto setis duabus submedianis longiusculis, scuto setis longiusculis 10 + 10; sterna setis sat numerosis brevibus et brevioribus instructa.

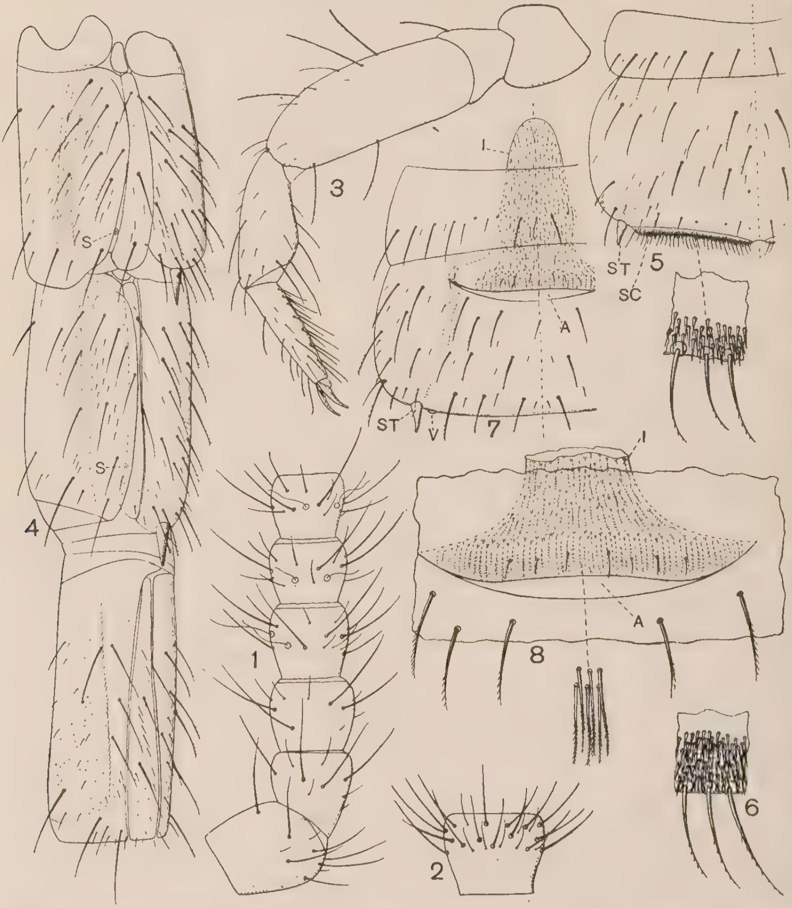
Pedes coxa, trocanthero et femore setis nonnullis longiusculis, tibia setis parum magis numerosis per dimidiam superficiem distalem, tarso setis ventralibus biseriatis c. 8 + 8, seta dorsuali subapicali ad dimidium unguem internum pertinente, ungue externo quam internus paullum breviore.

Abdomen. Tergitum 1$^{um}$ præscuto setis duabus submedianis brevibus, scuto setis longiusculis 5 + 5, tergita 2$^{um}$ ad 5$^{um}$ angulis posticis rotundatis, setis longiusculis et brevibus c. 15 + 15 præsertim sublateralibus et lateralibus, tergita 6$^{um}$ et 7$^{um}$ angulo postico subrotundato.

Urosternum 1$^{um}$ organis subcoxalibus latis fere totam partem posticam occupantibus setis sensitivis uniseriatis brevissime plumatis et setis glandularibus brevissimis inordinatim 3-seriatis instructis; superficie cetera setis sat numerosis brevibus ut urosterna 2$^{um}$ ad 7$^{um}$.

Segmentum ultimum supra mensum parum longius quam latius, superficie setis longis et longiusculis c. 10 + 10, acropygio parvo rotundato.

Forceps quam segmenti decimi longitudo paullum longior, vel vix brevior, brachio dextero parte distali tantum attenuata bene arcuata, cetero marginibus subparal-



Text-fig. 4. *Evalljapyx dispar:* antennæ lævæ articuli $1^{us}$ ad $6^{um}$; 2. ejusdem antennæ articulus $12^{us}$ magis ampliatus; 3. pes paris $3^{i}$; 4. abdominis segmenta $6^{um}$ ad $8^{um}$ lateraliter inspecta; S stigmata; 5. feminæ urosternum $1^{um}$, SC organum subcoxale, ST stilus; 6. maris urosterni $1^{i}$ organi subcoxalis perticula; 7. maris urosternum $3^{um}$; 8. maris urosterni $3^{i}$ cum infundibulo subantico: A infundibili apertura externa (figg. varie ampliatæ).

lelis, tuberculis perparvis 2–4 proximalibus superis margine cetero denticulis perparvis in exemplo nonnullo per marginem intermedium subevanidis c. 20, sinus distalis margine etiam denticulis perparvis 8–10, brachio lævo dente proximali sat magno, tuberculis prædentalibus uniseriatis 3, brachio cetero gradatim attenuato, arcuato, apice acuto, latere interno bimarginato margine supero tuberculis convexis minimis 6–8, margine infero tuberculis parvis, gradatim minoribus c. 18–20.

Long. corporis ad mm. 9; lat. urotergiti $7^{i}$ 1.10; long. antennarum 2.20. Mas. Urotergitum $7^{um}$ quam feminæ parum latius angulo postico retrorsum acute-rotundatim producto.

Urosternum $1^{um}$ quam feminæ setis glandularibus magis numerosis, inordinatim 5–7 seriatis.

Urosternum $3^{um}$ infundibuli subantici operculo lato, sacculo cuculliformi setis pernumerosis brevioribus plumatis instructo, longo (ad mm. 0.40).

*Habitat.* Exempla typica in Santa Cruz Insula (California meridionalis), La Playa Canyon, April 1915, lecta vidi et exemplum, a me ad Monterey, Calif., lectum et ut paratipum in 1910 ad *Ev. propinquus* relatum.

Observatio. Subspecies hæc ab *E. propinquus* Silv. antennis 27-articulatis et forcipis brachii dexteri sinu distali forma saltem distinguenda est.

### **Evalljapyx darlingtoni** sp. n.

Text-fig. 5; plate 19, fig. 1

♀ Corpus ochroleucum abdomine segmento sexto partim ferrugineo et a segmento septimo latericio forcipis marginibus nigrescentibus. Corporis setæ dorsuales et ventrales præter minores plurisque ramulo distali auctæ sunt.

Caput supra setis 16 + 16 mm. 0.156 longis, setis nonnullis brevioribus et brevissimis sat numerosis instructum; antennæ 25-articulatæ, articulo tertio subæque longo atque lato, setis majoribus mm. 0.156 longis, setis ceteris huius et articulorum ceterorum vide fig. 5 (1–2) maxillæ primi paris lobus internus laminis 5, quarum prima falciformi angusta attenuata, integra, ceteræ pectinatæ; palpus labialus tuberculiformis, setis duabus longis et seta intermedia aliquantum breviore auctus.

Thorax. Pronotum setis sat longis (mm. 0.24) 6 + 6, setis brevibus et brevioribus nonnullis instructum; meso- et metanotum præscuto setis submedianis sat longis 1 + 1 et 1–2 + 1–2 brevissimis, scuto setis 9 + 9 sat longis, setis 4 + 4 brevibus et nonnullis brevioribus; sterna setis longiusculis, brevibus consuetis et nonnullis brevioribus sparsis instructa.

Pedes setis nonnullis longiusculis per tibiæ partem distalem magis numerosis et per tarsum; hoc setis ventralibus 8 biseriatis, seta dorsuali subapicali brevi; prætarsi unguibus parum arcuatis, subæqualibus unguicula consueta.

Abdomen. Tergitum primum præscuto setis duabus submedianis brevibus et nonnullis brevissimis, scuto setis parum longis 5 + 5 et seta nonnulla breviore et brevissima; tergitum secundum setis sat longis 8 + 8, tergita 3–6 setis sat longis 10 + 10, setis duabus subanticis submedianis brevibus et setis paucis brevioribus et brevissimis instructa, tergitum sextum angulo postico obtuso, septimum octavo longitudine subæquale et quam idem parum latiore, angulo postico, subrecto haud producto, octavum margine laterali postico haud producto.

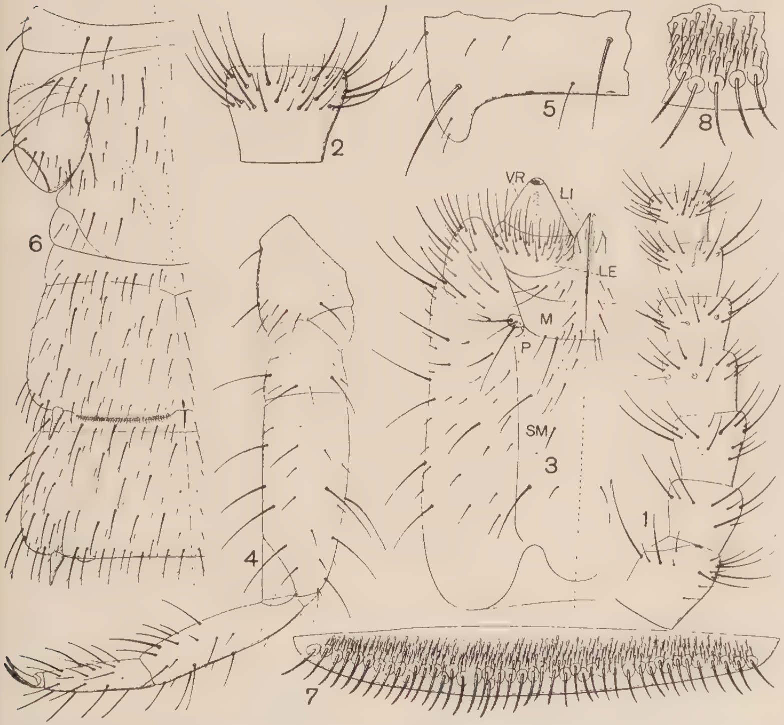
Urosternum primum organis subcoxalibus perlatis fere usque dimidium urosterni marginem attingentibus, setis glandularibus brevissimis pernumerosis 3–6 transverse inordinatim seriatis et setis sensitivis uniseriatis, fasi circulari sese tangentibus, brevibus, unilateraliter brevissime plumatis compositis, superficie cetera ut urosterna $2^{um}$ ad $7^{um}$ setis numerosis inordinatim transverse 5-seriatis et setis sparsis brevissimis aucta.

Segmentum decimum supra inspectum $\frac{1}{6}$ longius quam latius, carinis sublateralibus manifestis, parvis, setis longiusculis sublateralibus et lateralibus 8 + 8 et setis brevissimis sparsis instructum.

Forceps quam segmentum $10^{um}$ c. $\frac{1}{5}$ brevius, brachio dextero dentibus tuberculiformibus basalibus biseriatis: superis 5 perparvis, subtus 5 paullum majoribus, cetero margine usque sinum præapicalem denticulis 10, sinu præapicali denticulis 5 gradatim minoribus, brachio levo tuberculis prædentalibus 4, dente premediano sat magno, cetero margine sinu late arcuato denticulis biseriatis parvis: 7 superis et 9 inferis.

Long. corporis mm. 10; lat. urotergiti $7^{i}$ 1.10; long. antennarum 2.30.

*Habitat.* Exemplum typicum descriptum, clar. Dr. Darlington, cui species dicata est, in Main Range, Blue Mts., 5–7000 ft., Jamaica, Aug. 17–19, 1934, legit.



Text-fig. 5. *Evalljapyx darlingtoni:* 1. antennæ lævæ articuli $1^{us}$ ad $7^{um}$; 2. eiusdem antennæ articulus $10^{us}$ magis ampliatus; 3. caput subtus inspectum: T infundibulum subanticum, LE labii lobus externus, LO eiusdem lobus internus, M mentum, P. palpus labialis, SM submentum, VR vesicula retractilis; 4. pes paris $3^{i}$; 5. urotergiti $7^{i}$ angulus posticus; 6. metasternum cum urosternis $1^{o}$ et $2^{o}$; urosterni $1^{i}$ organus subcoxalis; 8. eiusdem particula magis ampliata (figg. varie ampliatæ).

Observatio. Species hæc ad *Ev. cubanus* Silv. proxima est, sed antennis 25-articulatis et forcipis forma facile distinguenda est.

### Gen. **Japygianus** nov.

Genus a genere *Catajapyx* Silv. forcipis brachiis subæqualibus, quam segmentum decimum parum magis quam $\frac{1}{4}$ brevioribus, crassioribus, dentibus uniseriatis numerosis, nonnullo magnitudine parum diverso, distinctum est.

Species typica: *Japygianus wheeleri* sp. n.

### **Japygianus wheeleri** sp. n.

Text-fig. 6; plate 19, fig. 2

♂ Corpus ochraceum abdomine segmento sexto parum obscuriore, a segmento septimo ferrugineo-latericio, forcipis marginibus nigrescentibus.

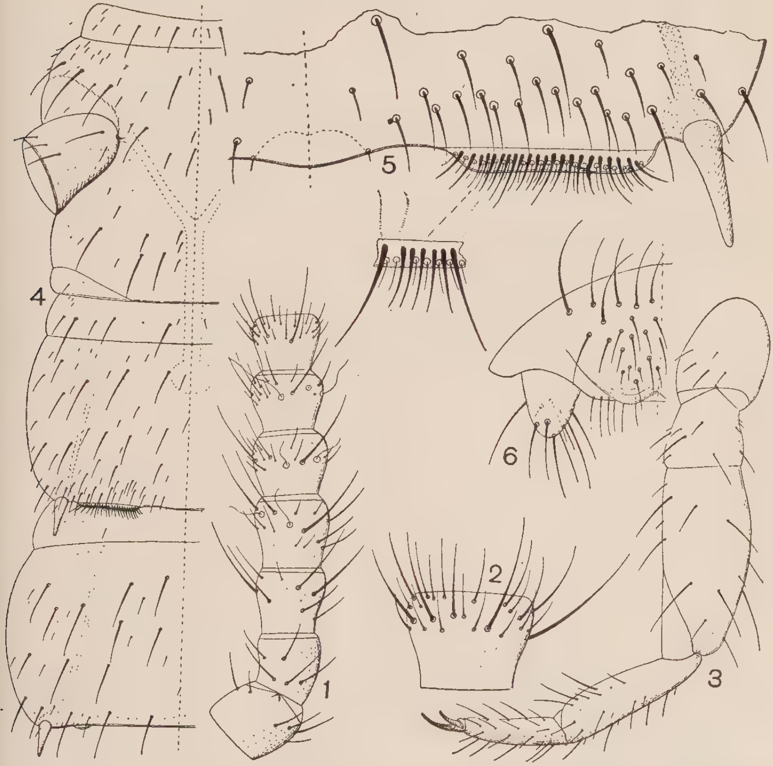
Caput supra setis brevibus (ad mm. 0.13) c. 18 + 18 et setis nonnullis brevioribus et brevissimis instructum; antennæ 30-articulatæ, articulo tertio subæque longo atque lato, setis majoribus mm. 0.19 longis, articulorum ceterorum etiam setis et trichobotriis consuetis vide fig. 6 (1–2); maxillæ primi paris lobo interno laminis pectinatis 5, palpo labialis mm. 0.11 longo subconico setis 6 brevibus et nonnulla breviore instructo.

Thorax. Pronotum setis sat longis (mm. 0.22) 5 + 5 et seta nonnulla breviore et brevissima instructum; meso- et metanotum præscuto setis duabus submedianis brevibus, scuto setis 6 + 6 sat longis et nonnulla breviore; sterna setis parum longis et nonnullis brevioribus ut fig. 6, demonstrat.

Pedes setis longiusculis nonnullis præsertim per tibiæ partem distalem, tarso setis numerosis brevibus, quarum inferæ, biseriatæ a $1^a$ ad $4^{am}$ gradatim longioribus, seta dorsuali subapicali ut laterales brevi, prætarsi ungue postico quam anticus aliquantum longiore, unguibus parum arcuatis robustis, unguicula bene distincta.

Abdomen. Tergitum primum præscuto setis duabus submedianis brevibus et scuto setis duabus submedianis subposticis parum longis et setis nonnullis brevissimis, tergitum secundum scuto setis 4 + 4 parum longis et setis duabus subanticis submedianis brevibus, tergita 3–7 setis parum longis 6 + 6 et setis subanticis submedianis duabus brevibus instructa, tergitum sextum quinto latitudine subæquali angulo postico obtuso, septimum quam quintum haud latius, angulis posticis angustioribus, acutis, corniformibus, retrorsum mm. 0.14 productis, octavum quam septimum c. $\frac{1}{6}$ angustius et parum brevius margine laterali postico acute aliquantum producto.

Urosternum primum organis subcoxalibus parum magis quam marginis inter stilos quartam partem occupantibus setis brevibus glandularibus c. 22, quarum 5 quam ceteræ parum longiores et setis sensitivis cum glandularibus alternatis et quam eadem brevioribus, superficie cetera ut urosterna 2um ad 7um setis brevibus c. 16 + 16 et non-



Text-fig. 6. *Japygianus wheeleri:* 1. antennæ lævæ articuli 1us ad 6um supra inspecti; 2. eiusdem antennæ articulus 10us magis ampliatus; 3. pes paris 3i; 4. metasternum cum urosternitis 1o et 2o; 5. urosterni 1i paro postica multo ampliata; 6. maris dimidia pars genitalis externa (figg. varie ampliatæ).

nullis brevissimis sparsis; vesiculis perparvis, stilis brevibus.

Segmentum decimum supra mensum c. 1/10 longius quam latius, superficie supera et laterali setis longis vel sat longis 9 + 9 carinis nullis, acropygio brevi, subtriangulari.

Forceps quam segmenti decimi latitudo c. ¼ brevius, brachiis robustis, brachio dextero dentibus 16, quorum quartus et sextus quam proximales paullum et nonus quam ceteri parum major est, posticis gradatim minoribus, brachio lævo etiam dentibus 16, quorum quartus, sextus et duodecimus quam ceteri parum majores sunt.

Appendices genitales breviores, subconicæ, setis parum longis 8 instructæ.

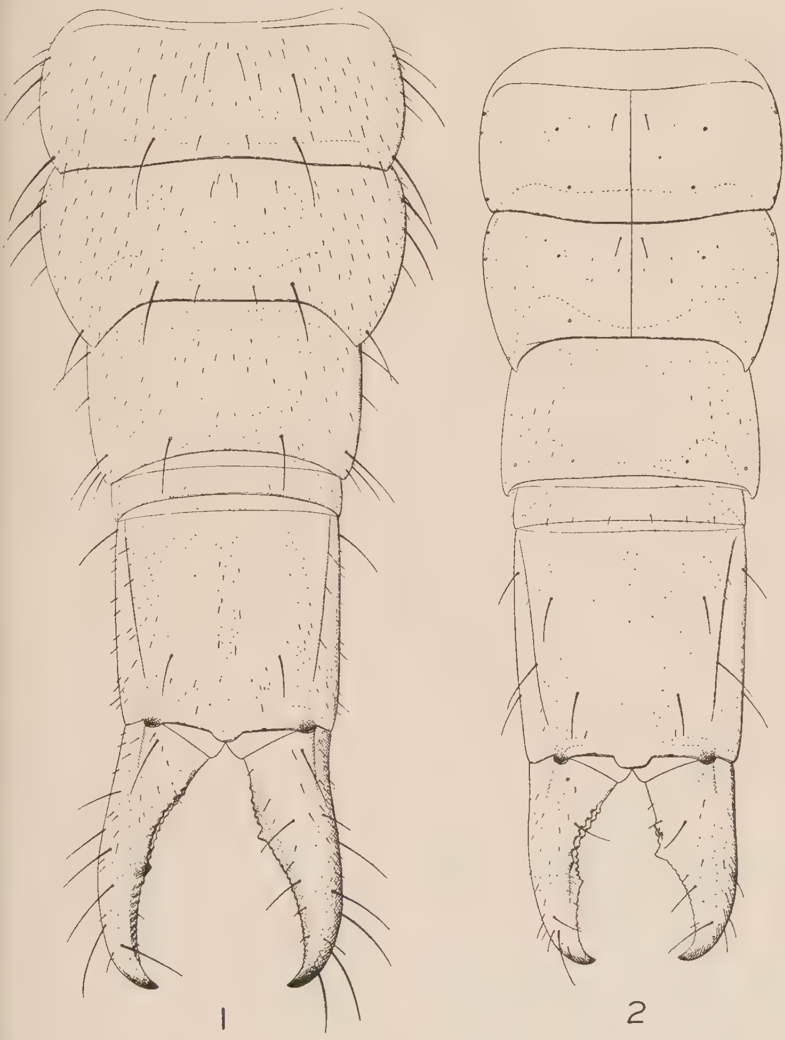
Long. corporis mm. 8; lat. urotergiti septimi 1; long. antennarum 2.4.

*Habitat.* Exemplum typicum descriptum ad Kuranda (Queensland), Oct. 21, Dr. W. M. Wheeler, cui speciem in memoriam dico, legit.

## EXPLANATION OF PLATE 17

Fig. 1. *Metajapyx subterraneus:* abdominis pars postica a segmento 6° prona (fig. ampliata).

Fig. 2. *Metajapyx confectus:* abdominis pars postica a segmento 6° prona (fig. ampliata).

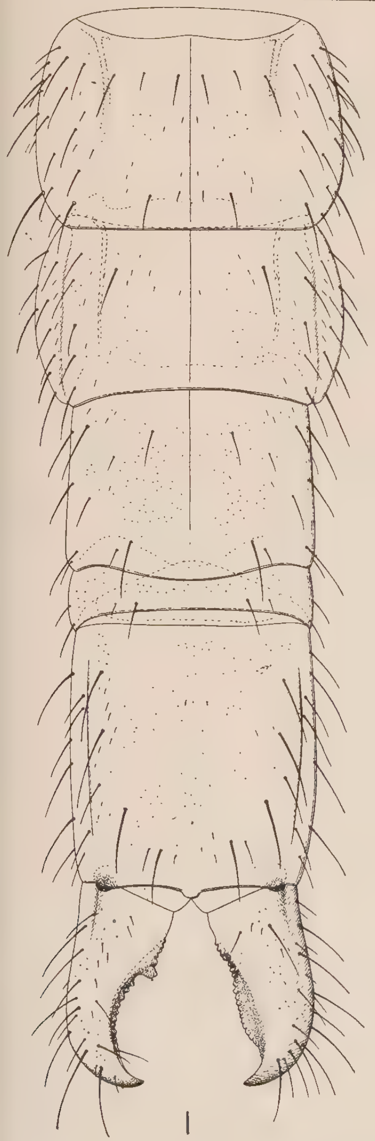


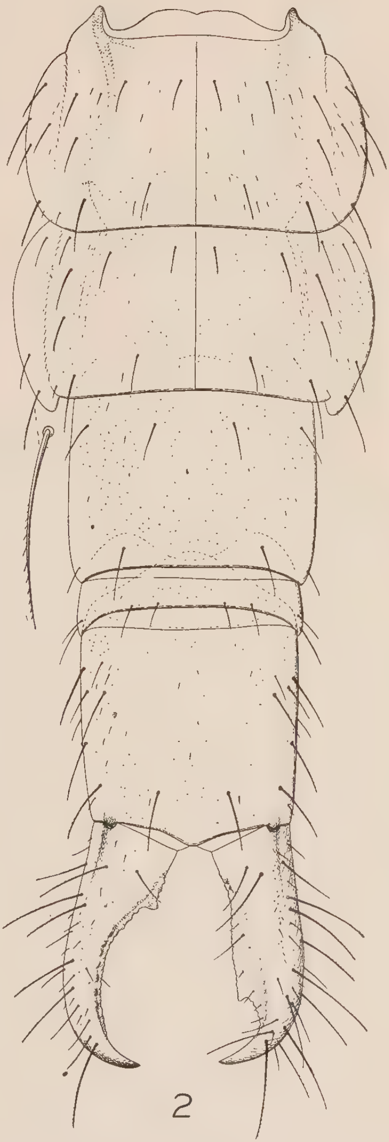
Silvestri—Japygidæ

## EXPLANATION OF PLATE 18

Fig. 1. *Evalljapyx sonoranus:* abdominis pars postica a segmento 6° prona (fig. ampliata).

Fig. 2. *Evalljapyx dispar:* abdominis pars postica a segmento 6° prona (fig. ampliata).



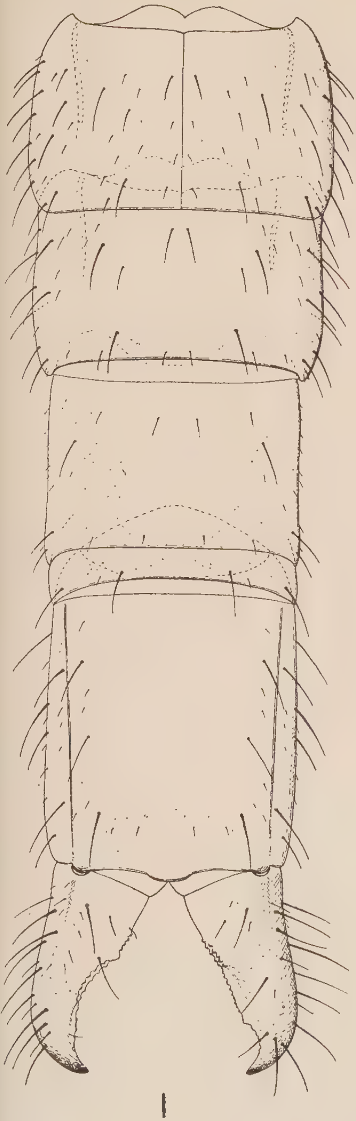


SILVESTRI—JAPYGIDÆ

## EXPLANATION OF PLATE 19

Fig. 1. *Evalljapyx darlingtoni:* abdominis pars postica a segmento 6o prona (fig. ampliata).

Fig. 2. *Japygianus wheeleri:* abdominis pars postica a segmenta 6o prona (fig. ampliata).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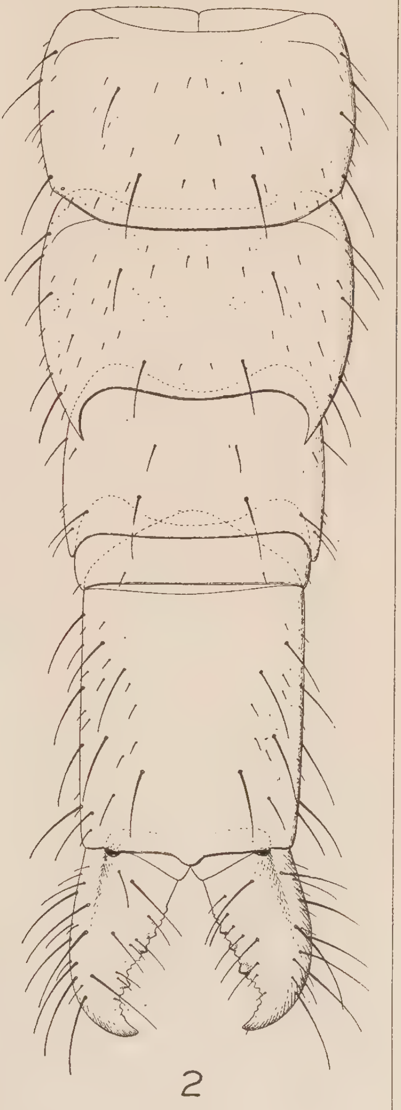
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SILVESTRI—JAPYGIDÆ

# SOME AMERICAN SYRPHID FLIES

By Frank M. Hull
University of Mississippi

Recent collections of flies submitted to the author contain a number of neotropical species of *Baccha* which are undescribed. This paper gives the descriptions of these flies. A species of *Rhinoprosopa* is included.

### **Baccha balboa** n. sp.

A petiolate species, the face without tubercle, the anterior margin of the wing narrowly brown. Related to *bigoti* Austen but without the reddish spots on the fourth segment and with different pattern upon the wing. Length 10 mm.

Male. *Head:* the vertex is polished black, rather flat, the long black pile lies in a single row. The front is black, with faint bluish reflections and protuberant just in front of the narrow antennal callus; the sides of the front are diffusely yellowish grey pollinose; the frontal pile is long and fine and black. The face is black with faint bluish reflections, nearly straight in profile but retreating and without tubercle; the sides are widely yellowish grey pubescent with similarly colored pile. The antennæ are dark brown, the third segment and apex of the second segment reddish below; arista dark brown. The occiput is yellowish grey pollinose with fine, white, non-scalose pile which becomes blackish near the vertex. The posterior eye margin is not indented in the middle but the eye is developed above so that the occiput can not be seen laterally on the upper third. *Thorax:* the mesonotum is polished shining including the scutellum; the humeri and the post calli are shining, dark sepia brown; there are no vittæ present and no pollen. The mesonotal pile is fine, erect, fairly long and blackish without anterior collar, the pile becoming shorter and pale yellow in front of the scutellum. The scutellar pile is fine and long and yellow; the ventral fringe consists of fifteen or more pairs of long, pale yellow hairs; the pleura are black and somewhat brassy down the middle, their pile thick, long and pale yellow. The squamæ are white, the fringe and border pale yellow, the halteres dark brown. *Abdomen:* slender and petiolate, first segment wholly shining greenish black with long, abundant, fine yellow pile on the sides. The second segment is light brownish red, shining and with a slender, medial, brownish black line running almost the full length of the segment stopping close to the base; this segment is nine times as long as its least width; the width at the apex is a little more than one and one-half times as long as the least width, the basal width barely greater than the apical width. The third segment has a pair of large, pale, brownish red, elongate, postero-medially produced spots upon the base of the segment which are separated by light brown in the middle; the remainder of the segment except the posterior border is nearly opaque black, the posterior margin shining. The fourth and fifth segments are wholly shining black; the fourth segment is not quite twice as long as wide. The sides of the second segment have long, fine, abundant pile directed outwardly; there is similar but shorter pile on the sides of the third segment except the posterior fifth where it is appressed; there is still shorter erect pile on the sides of the basal half of the fourth segment; the erect pile on the third and fourth segments is reddish yellow but on the second segment it is chiefly blackish except at the immediate base. All other pile of the abdomen is black. *Legs:* the anterior and middle femora are light reddish brown; their tibiæ are pale brown becoming a little more yellowish close to the apices and the base. The anterior tarsi are brown, the middle tarsi entirely yellow. The hind femur is sepia except at the extreme apex; hind tibiæ black, the base narrowly yellowish, its pile black. The hind basitarsi are black on the basal half with sepia pile, diffusely shading in the middle to pale yellow; the remaining segments are pale yellow. The pile of the hind femur is sepia to black. *Wings:* pale brownish hyaline; the pterostigma and the anterior margin of the wing to the end of the submarginal cell is dark brown. The dark brown margin extends back along the submarginal cell a distance basally beyond the end of the subapical cross vein equal to the petiole of the first posterior cell. The marginal cell except at the apex of the wing, the costal cell and a large diffuse spot in the middle of the wing are more yellowish or reddish brown. The central wing spot extends only narrowly beyond the anterior cross vein, which cross vein lies close to the base of the discal cell, and borders the cubital cross vein. The whole subcostal cell is dark brown; alulæ quite wide.

Female. Similar to the male, the sides of the front greyish white pollinose; the ground color of the front is strongly shining bluish black but in the middle it appears to be more purplish black; the occipital pile is confined to a single, neatly formed row of long, pale yellow hairs which become reddish brown above and nearly whitish close to the oral margin where there are several rows of hairs. Notopleural bullus rather conspicuous, the posterior part of the notopleura whitish pollinose. The mesonotal pile is a little shorter than in the male, the pleura have an obscure brownish red stripe down the middle; the pteropleura are wholly metallic black; the halteres have a yellowish brown to reddish knob. Upon the abdomen the medial dark brown stripe of the second segment appears to be wanting and the basal spots of the third segment smaller and more diffuse.

Holotype: a male, La Suiza, Costa Rica, 24; Pablo Schild; allotype: a female with the same data without numeral; there is also a paratype male and female with the same locality and collector. Type and allotype in the collection of Dr. A. L. Melander.

### **Baccha zephyrea** n. sp.

A slender species related to *argentina* Curran, but with different pattern. Length 8 mm.

Male. *Head:* the vertex is quite protuberant, black, the black pile in a single row; the bluish black front is prominently transversely striate and abundantly long black pilose on the sides but rather bare in the middle and the sides of the front are linearly yellowish white pollinose; the lunate antennal callus is yellowish brown, blackish in the middle. The face is metallic blackish on the upper half becoming light yellowish brown on the tubercle and the cheeks; the middle of the cheeks with a brownish spot. The antennæ are yellowish brown. *Thorax:* the mesonotum is strongly brassy black, coppery just in front of the postcalli; the lateral margins and the notopleura appear to be yellowish brown in ground color but so dark as well as metallic in reflections that they do not contrast greatly with the disc of the mesonotum. The mesonotum has a pair of short, obscure, brownish red pollinose vittæ and some sparse, similar pollen in front of the scutellum. The mesonotal pile is sparse, short and apparently light in color; pleura metallic black, only the posterior part of the mesopleura and the anterior part of the pteropleura are obscure yellowish brown; the squamæ are light yellow, the stalk of halteres pale yellow with reddish brown knob. *Abdomen:* very slender and petiolate, the first segment black, its protuberant lateral margins light brownish yellow. The spots of the abdomen are sharp and distinct but are for the most part pale brownish orange. On the sides of the base of the second segment there is a quite long spot of light color, occupying about a third of the length of the segment sharply and distinctly separated by black in the middle; beginning just before the middle of the segment there is a long, complete pale band occupying a little more than one-fourth the length of the segment; remainder of this segment shining black. The second segment is fifteen times as long as its least width and not quite twice as wide at apex and just twice as wide as its base. The third segment has two long, complete bands of light color, one on the base, one beginning just before the middle of the segment, divided by a narrow brown line; the fifth segment is wholly black; the hypopygium is prominent. The pile along the second segment is very sparse and short. *Legs:* the anterior legs are entirely brownish yellow, the middle legs missing. The posterior femora and tibiæ are very pale yellowish brown, their tarsi almost as light; the dorsal surface of these tarsi is pale brown with brown pile; the pile of the hind tibiæ is quite sparse, quite short and dark in color. *Wings:* not quite hyaline; the pterostigma is yellowish brown, the costal and basal cell slightly paler than the remainder of the wing; there is no alula, not even a trace.

Holotype: a male, Villarica, Paraguay, August, 1938; F. Schade collector. In the collection of Dr. A. L. Melander.

## **Baccha ursula** n. sp.

A dark, sepia brown species with sepia brown wings. Related to *danaida* Hull but with differently shaped spots on the abdomen. Length 11.5 mm.

Male. *Head:* the vertex is dully shining black, considerably raised, its pile black and situated in a single row. The lateral margin of the eye is considerably incised on the posterior surface; the occipital pile is fine and yellowish white. The front is black, moderately shining, faintly brassy in some lights with the lateral margins narrowly but diffusely yellowish. In an oblique light the middle of the front is very dark brown pollinose; the preantennal callus is shining black in the middle and narrowly yellow above each antennæ. The face has a reddish brown tubercle; the sides of the face and the area below it are light brownish yellow; the middle of the face above the tubercle is diffusely brownish black with little angular spots which are slightly more widely separated and lie slightly before the middle of the segment. Fourth segment with a pair of similar though slightly more obscure, or diffuse and vittate, or longitudinal, oval spots which also lie just before the middle of the segment. Fifth segment without spots. The middles of the second, third and fourth segments are only sub-opaque when viewed obliquely. *Legs:* the anterior and middle femora are yellowish or reddish brown becoming slightly darker towards the base, their tibiæ and tarsi are entirely pale brownish orange. The hind femora are light reddish sepia, their tibiæ similar but a little darker in the middle and the pile of the tibiæ more nearly blackish in the middle. The base of the hind basitarsi is brown with sepia brown pile, the remainder of these tarsi light brownish yellow with golden pile. *Wings:* dark sepia brown throughout, the pterostigma and the basal portion of the marginal cell a little bit darker. Alulæ well-developed, long and narrow.

Female. Similar to the male, the vertex, however, is not especially raised; the sides of the front are also diffusely brownish yellow, the middle dark brown pollinose; the first two segments of the antennæ are reddish brown in color, rather darker than in the male. *Thorax:* the mesonotum is bright coppery violaceous in color, the widely separated yellowish brown vittæ are somewhat more narrow, the lateral margin a little more yellowish; the light colored areas of the pleura are more yellowish and extend across the pteropleura and include much of the metapleura. The squamæ are distinctly yellowish brown. The scutellum is lighter in color than in the male, is brownish yellow especially around the margins and the base; its pile is also sparse but is shorter; there is no ventral fringe. *Abdomen:* much wider and even more flattened than in the male; the sides of the fifth and sixth segments are somewhat emarginate; the second segment is almost rectangular, but is a little wider at the apex than at the base. The fourth segment has parallel sides. The apical portion of the abdomen is considerably wider than in the male; the second segment is also wider; the spots upon the second segment are linear, upon the third segment they are very short oval or subcircular but irregular and diffuse; on the fourth segment the spots are linear, smaller and much more obscure; on the fifth segment there is a trace of linear, yellowish brown spots. Legs similar to the male; the wings are similar to the male, quite dark, the whole marginal and submarginal cells slightly darker than the posterior part of the wings; there is a faint streak of light color in the costal cell and along the base of the vena spuria. These streaks may be abberant.

Holotype: a male, Villa Rica, Paraguay, September 1938; F. Schade; allotype: a female, same locality, February 1940; F. Schade. There are two paratype males, Feb. 1940 and Feb. 1941 from the same locality. Holotype and allotype in the collection of Dr. A. L. Melander.

### **Baccha cybele** n. sp.

A black species, the wings sepia brown with only the apical fourth hyaline. Second, third and fourth segments of the hind tarsi white. Related to *clarapex* Wiedemann. Length 9.5 mm.

Male. *Head:* the vertex is bluish black and shining, moderately raised, the black pile lies in a single row; the posterior lateral eye margins are deeply incised in the middle; there is a long row of silvery occipital pile behind, fine and non-scalose, long in the middle becoming blackish towards the top of the occiput; along the indented area of the eye there is a double row of long fine black hairs which are replaced by white ones on the lower part of the occiput. The occipital pollen is greyish white but the black hairs arise from minute black punctate spots. Front black, faintly bluish and in some lights with an azure blue reflection. The upper third of the front is opaque black bordered by brown pollen and in turn the brown pollen bordered with a spot of silvery pollen which lies on the upper eye margin and is visible only from above. The antennal callus is large, shining brownish black, narrowly and diffusely brownish yellow along the sides in the middle of the face only. The cheeks are metallic black; the sides of the face are widely white pubescent or pollinose; the tubercle is rather sharp, gently sloping above, somewhat more abruptly below. The antennæ are dark brown, reddish brown below at the base of the third segment. The arista is dark brown but lighter at the immediate base. The frontal pile and nearly all of the basal is black. *Thorax:* the mesonotum is black, moderately shining with a pair of very obscure, reddish brown pollinose spots on either side of the middle of the anterior margin; the entire anterior margin is more narrowly but similarly pollinose. There is a still more obscure, narrow, greyish streak down each side of the mesonotum reaching nearly to the transverse suture. The pleura are wholly metallic black, thinly whitish pollinose and with long sparse yellowish white pile. The scutellum is black with only a few, long, fine black hairs; the ventral fringe consists of seven or eight pairs of moderately long black hairs. There is an anterior mesonotal collar of pale yellow hairs. The squamæ are light brown, the halteres pale brown with reddish knob. *Abdomen:* petiolate, shining black, the first segment with slight bluish reflections, its sides with thick long yellowish white pile and some black hairs both dorsally and anteriorly. The second segment is a little bluish along the sides and narrowly along the apical margin. There is a prominent, subapical, opaque black annulus which is prolonged and produced forward in the middle to within a short distance of the base. The second segment is slightly over three times as long as its least width. The third segment is considerably wider, especially at the apex and with a pair of obscure, opaque black triangles on either side and medial opaque stripe. The fourth segment is similar, the opaque areas less distinct. On both the third and fourth segments the opaque areas are only visible from an oblique posterior or anterior view. The fifth segment is wholly shining black; the pile of the abdomen is black beyond the first segment except for a very few white hairs on the sides of the second segment near the base. *Legs:* the anterior and middle femora and tibiæ are brownish black; their apices and bases of the tibiæ are narrowly reddish brown. The anterior and middle tarsi are dark brown; the hind femora, except the narrow base and apex and the hind tibiæ except the extreme base, are black, both with black pile. The basal three-fourths of the hind basitarsi are black and black pilose; remainder of these tarsi with nearly similarly colored pile. *Wings:* sepia brown throughout except upon the apical fifth; the brown color fills the discal cell. The alulæ are wide and well-developed; there is an abnormality in the second longitudinal vein near the end of the marginal cell in both wings; it consists of a spur directed obliquely outward cutting half way across the submarginal cell.

Holotype: a male, Villa Rica, Paraguay, Nov. 1938 collected by F. Schade; one paratype male, Dec. 1936 but otherwise the same data. Type in the collection of Dr. A. L. Melander; paratype in the author's collection.

### **Baccha duida** n. sp.

A quite slender fly with dilute, light brown wings and without alulæ. The third vein is deeply drawn down posteriorly as it reaches the wing apex. Length 9.10 mm.

Male. *Head:* face and front light brownish yellow but medium brown in the center of the front which merges into a blackish, medial, elongate spot just above the antennæ. The antennæ are short, the third segment thickened and rounded and light brown; the basal segments are darker, their pile black. The front and facial pile is black, the face narrow, the creases deep, the face barely more narrow ventrally. The vertex is raised and rather shining black, its black pile is situated in a single row; the posterior part of the vertex is brownish pollinose. The upper occipital pile is reddish golden and brassy on the sides. *Thorax:* mesonotum shining black with three slender, reddish-brown pollinose vittæ; the outer one may possibly be divided into two posteriorly. The humeri, the lateral margins, the post calli and all of the scutellum, all the pleura except the posterior part of the metapleura, the lower part of the sternopleura and the anterior part of the mesopleura, are all light reddish brown; the remainder of the pleura are dark brown and the disc of the scutellum viewed from the side appears dark brown. The mesonotal pile is sparse, fine, erect and brown. The ventral scutellar fringe consists of six or seven short black hairs. *Abdomen:* quite slender and dark brown becoming black on the posterior portion of the segments; the second segment has a pair of narrowly separated, elongate, orange brown spots beginning just past the middle and margined dorsally with opaque black and extending down the lateral margins; laterally these spots show a slight posterior indentation. The third segment has a similar pair of spots in the middle, longer, anteriorly attenuated and with V-shaped notch posteriorly. The fourth segment has a similar pair of spots of about the same size. The spots on both the third and fourth segments show some indication of running narrowly and obscurely to the base of the segment; the basolateral areas of the segments are, however, shining brownish black; fifth segment shining black. The pile along the sides of the second abdominal segment is very sparse and short but a little longer on the posterior half; the pile on the sides of the first segment is sparse and moderately long in the corners and brownish black. *Legs:* anterior pair light brownish yellow with pale pile; medial pair light brown, the lateral fringe of the middle femora moderately long and reddish brown. The hind femora are pale reddish brown with wide, obscure, darker brown subapical bands. The hind tibiæ are slender, preapically compressed, straight and reddish brown with, in the middle, a brownish yellow band. The hind basitarsi are slender and entirely brown with dark brown pile on the dorsal surface and brownish yellow pile below; last segments missing. The pile of the hind tibiæ and femora is brownish black. *Wings:* slender, and light brown including the costal cell; stigmal cell dark brown, lighter below the costal cell; the third vein is arched and considerably drawn down apically; alulæ quite absent; anal lobe almost hyaline.

Holotype: a male, Mt. Duida, Venezuela, Dec. 1, 1928. Accession 25500, 423; Tate. In the American Museum of Natural History.

### **Rhinoprosopa sycorax** n. sp.

A yellow and brown species with pale yellowish wings. Related to *lucifer* Hull. Length about 9 mm.

Female. *Head:* the vertex is brassy black, the ocelli set off by a crease touching their margins; the vertical pile is short and black. The front is brownish black in the middle with the sides ochraceous yellow and in the midline there is a brassy, linear stripe wider on the upper half; the face is reddish sepia in the middle with a very low pinched tubercle; the sides of the face and cheeks are light yellow. The face is triangularly produced forward as is characteristic of the genus but not as much as in *ænea* Hull. The antennæ are slightly elongate and reddish orange; the dorsal surface of the third segment is blackish, the arista black. The pile of the front is fine and sparse and black; the sparse facial pile is whitish; the pile of the occiput is yellowish brown becoming black near the top. *Thorax:* the mesonotum is moderately shining greenish to brassy black; the whole notopleura and the humeri and a wide stripe down the pleura are light reddish yellow; the postcalli and the scutellum are brownish yellow; the scutellum in oblique view appears to be darker brown upon the disc, its pile is quite sparse and short and blackish with here and there a reddish hair; the ventral scutellar fringe apparently is absent. The squamæ are dark sepia, the halteres reddish brown. *Abdomen:* first segment brownish yellow narrowly on the posterior margin with a few long, reddish brown hairs on the sides of the base; the second segment is sepia brown with very obscure, oblique oval spots on each side of the middle of the segment enclosed by obscure opaque color. The third segment is almost the shape of an equilateral triangle; it is sepia brown with obscure, reddish brown, quite oblique vittæ proceeding from the base of the segment and running to the sides and then reaching the sides of the segment close to the posterior segment. The area in the middle behind these vittæ constitutes a definitely opaque brown triangle in which, however, the posterior margin is obscure. The fourth segment has a complete, arcuate, rather narrow but reddish brown band which is somewhat lighter than the preceding vittæ; the area behind is obscurely opaque. The fifth segment is obscurely lighter brown in the corners and with a suggestion of an arcuate opaque band behind. *Legs:* anterior and middle legs entirely yellow; basal half of hind femora yellow, the apical half brown. The posterior tibiæ and tarsi are pale reddish brown with dark brown pile. *Wings:* light brownish yellow throughout, the pterostigma of a slightly darker shade of yellow brown and the apex of the marginal and submarginal cells with a more distinctly brown but very diffuse spot which shades gradually into the paler color. Alulæ well-developed though not much wider apically than basally.

Holotype: a female, La Suiza, Costa Rica, 12–IX; Pablo Schild. In the collection of Dr. A. L. Melander.

# TWO NEW TIGER BEETLES FROM NEW GUINEA[1]

By P. J. Darlington, Jr.
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The following two new species of the well-studied family Cicindelidae are of unusual interest. One is the second known species of *Caledonomorpha,* the only genus of the family confined to New Guinea. The other constitutes the first record for New Guinea of the widely distributed genus Prothyma.

### **Caledonomorpha milneana** n. sp. (Fig. 1)

Similar in generic characteristics, and nearly similar in form and general appearance, to *Caledonomorpha jordani* W. Horn (1897, pp. 270–271; 1910, p. 179, t. 11, f. 12), but slightly smaller and less elongate. Color of body green; but labrum testaceous basally; top of head (except labrum) and pronotum (except at sides) bluish purple; elytra brown with bluish or purplish reflections and green punctation, and each elytron with 3 small marginal or submarginal white spots, one humeral, one before middle, one ante-apical; abdomen piceous except green at sides anteriorly, testaceous apically. Surface of body including elytra with distinct, fine, isodiametric or slightly transverse, reticulate microsculpture. Mandibles piceous, except testaceous externally in basal half; palpi testaceous, each with apical segment entirely or partly piceous; antennæ piceous; legs piceous externally (with green reflections on basal half of femora), testaceous internally. *Head:* with mandibles elongate, each with 4 long teeth about as in *jordani;* mentum tooth long and acute; labrum transverse, not quite so short as in *jordani,* irregularly truncate, with one seta each side and 2 near middle; eyes prominent; antennæ very elongate; palpi long, slender. *Prothorax* subquadrate, longer than wide, transversely impressed and slightly constricted near base and apex, with median longitudinal line less impressed;

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[1] Published with a grant from the Museum of Comparative Zoölogy at Harvard College.

disk slightly, transversely wrinkled, impunctate. *Elytra* relatively a little shorter than in *jordani;* each with outer apical angle spined, sutural angle not distinctly toothed, humeral prominence present but less developed and less acute than in *jordani;* surface moderately punctate, the punctures usually separated from each other by more than their own diameters. Male genitalia as figured.

Length 10–11; width between 3 and 3½ mm.

Holotype ♂ and one ♂ paratype both from north side of Milne Bay, eastern tip of New Guinea, December 1943, taken by myself. Types in the Museum of Comparative Zoölogy: Type No. 27734.

This new species is slightly smaller and less elongate than *Caledonomorpha jordani* W. Horn, differs in ground color of the upper surface, lacks a distinct tooth at the apical sutural angle of the elytron, has less prominent and less acute humeral prominences, and differs slightly in other ways.

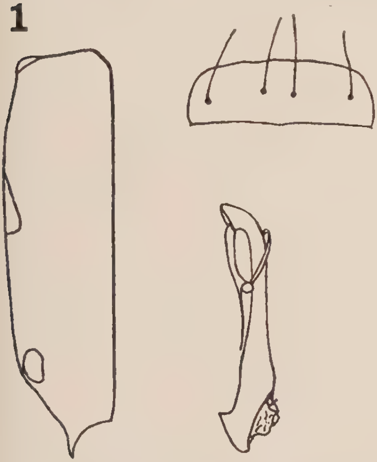
*Caledonomorpha* is the only genus of tiger beetles peculiar to New Guinea. *C. jordani,* the only previously known species, is apparently confined to *eastern* New Guinea and adjacent small islands. It was described from Fergusson (Island) and the Astrolabe Mts., and in the M.C.Z. we have a series of 8 specimens from Mt. Lamington and Dobodura. It is rather surprising to find a second eastern New Guinea species at Milne Bay. In case Horn's original series may have been mixed, *I here designate the form figured in Genera Insectorum (W. Horn 1910, t. 11, f. 12) as typical* jordani. Possibly additional species remain to be discovered in western New Guinea.

I collected *C. jordani,* in northern foothills of the Owen Stanley Range near Dobodura, on stones and shrubs along small, very rapid brooks in heavy forest. Probably *C. milneana* lives in a similar habitat, although I do not remember the circumstances under which the types were collected.

### **Prothyma papua** n. sp. (Fig. 2)

A rather small *Prothyma s. s.* Brown-bronze above, purplish blue below; elytra each with a narrow, irregular, yellowish white lateral vitta from behind humerus to apex; lateral (not apical) margin purplish blue, the color extending inward to form distinct marginal spots about $\frac{1}{3}$ from base and just behind middle, and less distinct spots behind humerus and near apical $\frac{1}{4}$th; labrum bronze; mandibles and antennæ brown, latter paler near base; palpi irregularly brownish testaceous with apical segments darker; legs irregularly brownish testaceous, paler internally, with femora vaguely spotted or banded with darker before apex; posterior tibiæ paler toward apex, but actual apices dark; posterior tarsi with 2 basal segments pale, 3 outer ones darker. *Head:* with labrum long, 5-dentate, 4-setose, with deep, almost isodiametric, reticulate microsculpture; clypeus without setæ; eyes very prominent; antennæ long (in genus), first segment of each with a single seta in front near apex; upper surface of head (except labrum) rugose, the rugosity becoming longitudinal between the eyes and forming about 32 parallel, somewhat anastomosing striæ; mentum tooth

1



2

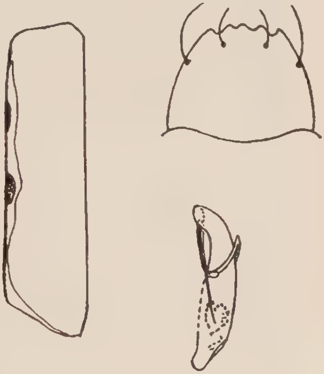


Fig. 1. *Caledonomorpha milneana* n. sp. (holotype). Camera-lucida outlines of left elytron (from perpendicular to suture), labrum, and male genitalia (from left, with left paramere).

Fig. 2. *Prothyma papua* n. sp. (holotype).

moderate, triangular; palpi slender (in genus). *Prothorax* small, quadrate, just wider than long (by measurement); pronotum with usual anterior and posterior transverse impressions; median longitudinal impression vague; surface rugose. *Elytra* obliquely sinuate-truncate at apex (more widely than usual); each with a small tooth at sutural angle; surface with microsculpture like labrum, and also moderately punctate, most of the punctures being rather small and separated from each other by much more than their own diameters; a few larger punctures, some bearing small hairs, scattered in basal ⅓ of disk and widely spaced in one line on each elytron parallel to suture to within ¼ of apex. *Lower surface* of body not distinctly punctate and not pubescent except for setæ on all coxæ and pairs of setæ on 4th and 5th segments of abdomen; 6th ventral (♂) deeply emarginate, without hairs (some hairs present on apparent 7th segment); thighs without hooked hairs. Inner wings fully developed. Male with 3 basal segments of front tarsus slightly dilated, white, and pubescent below (outer segments slender, dark); male genitalia as figure.

Length 8; width c. 2½ mm.

Holotype ♂ and one ♂ paratype, both from north side of Milne Bay, eastern tip of New Guinea, December 1943, taken by myself; ecological habitat not recorded. Types in Museum of Comparative Zoölogy: Type No. 27735.

To understand the relationships and geographical significance of this new species, one must understand first the previously known distribution of *Prothyma*. The genus in the strict sense includes some 50 species, of which a few are in Africa, many in Madagascar, 2 on Mauritius and Reunion, many in the Oriental Region east to Java and the Philippines, one in temperate China (W. Horn, 1935, p. 24), and one in southern Mexico in the edge of the American tropics. Until now, no *Prothyma* in the strict sense has been known east of Wallace's Line, but endemic subgenera, each with one or two species, are localized in Celebes, northwestern Australia (W. Horn, 1936, p. 22), New Caledonia, and Samoa (W. Horn, 1934, p. 144). These subgenera are marked either by a short labrum, or a bidentate labrum, or by reduction of width of head in relation to prothorax, characters that are not even suggested in the new New Guinea species. The latter is therefore not only the first *Prothyma* of any sort found in New Guinea, but it extends the known range of *Prothyma s. s.* into the Australian Region. It appears to be a very distinct species. It differs from most Oriental *Prothyma* (*e.g.*, from *quadripunctata* F. and *heteromalla* Macl. of Java) in elytral color pattern, which in most Oriental species consists of white spots on a dark or metallic background, but which in *papua* consists of an incomplete pale submarginal and apical vitta partly interrupted by incursions of the narrow marginal metallic color. The elytra are wider near the apex in *papua* than in any other *Prothyma* of which I have seen specimens or figures.

## BIBLIOGRAPHY

Horn, W.
1897. Ann. Mus. Civ. Stor. Nat. Genova, Vol. 37.
1910. Wytsman's Genera Insectorum, Fasc. 82B.
1934. Natuurhistorisch Maanblad (Maastricht), Vol. 23.
1935. Arkiv för Zoologi, Vol. 27A, No. 4.
1936. Entomologische Blätter, Vol. 32.

# INSECT RECONNAISSANCE IN LIBERIA, WEST AFRICA

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The Republic of Liberia lies approximately between 4° 22′ to 8° 50′ north latitude, and 7° 33′ to 11° 32′ longitude west of Greenwich. It has one of the most humid and rainiest climates of Africa. The rainy season begins in April and terminates in November, the annual rainfall being as much as 170 inches.

This paper is a report of an insect reconnaissance in many localities in the hinterland and coastal areas of Liberia. Collections were made throughout the year. Accordingly, an overall picture of seasonal distribution was obtained; this will be reported in a later paper.

In the following list families are arranged in accord with recent phylogenetic studies. Among the Diptera there are five new distributional records for Liberia and four undescribed species. Definite localities are given for all of the specimens.

## Diptera

### Tipulidæ

1. *Trentepohlia exornata* Bergr. Roberts Field; Harbel.

The collection also contains unidentified species of *Elephantomyia, Lecteria, Megistocera* and *Tipula* collected at Roberts Field and Harbel.

### Bibionidæ

Unidentified species of *Plecia* collected at Roberts Field and Harbel.

### Fungivoridæ

Unidentified species of *Cerotelion, Delopsis, Lycoria, Neoempheria* and *Trichosia* collected at Roberts Field and Harbel.

### Tendipedidæ

Unidentified species of *Tendipes* collected at Roberts Field.

### Heleidæ

Unidentified species of *Forcipomyia* collected at Roberts Field.

### Psychodidæ

2. *Brunettia albonotata* (Brun.) Harbel.
3. *Telmatoscopus albipunctatus* (Will.) Roberts Field; Harbel.

### Culicidæ

4. *Anopheles funestus* Giles. Roberts Field; Harbel; Gbanga.
5. *Anopheles gambiæ* Giles. Roberts Field; Harbel; Owen's Grove; Marshall; Kakata; Fisherman's Lake; Reputa; Salala; Cape Palmas; Grand Bassa.
6. *Anopheles hancocki* Edw. Roberts Field; Harbel; Fisherman's Lake.
7. *Anopheles nili* (Theob.) Roberts Field; Harbel.
8. *Anopheles paludis* Theob. New record for Liberia. Roberts Field.
9. *Aëdes* (*Aëdimorphus*) sp. very close to *filis* I. & M. Roberts Field.
10. *Aëdes ægypti* (L.) Roberts Field; Harbel; Kakata; Monrovia.
11. *Aëdes africanus* (Theob.) Roberts Field; Kakata.
12. *Aëdes luteocephalus* Newst. Roberts Field.
13. *Aëdes vittatus* (Bigot). Roberts Field.
14. *Culex annulirostris consimilis* Newst. Roberts Field; Harbel.
15. *Culex bitæniorhynchus* Giles. Roberts Field; Harbel.
16. *Culex guiarti* Blanch. Roberts Field; Harbel.
17. *Culex moucheti* Evans. Roberts Field; Harbel.
18. *Culex nebulosus* Theob. Roberts Field; Harbel.
19. *Culex tigripes* Gr. & Ch. Roberts Field; Harbel.
20. *Eretmapodites chrysogaster* Graham. Roberts Field; Harbel.
21. *Mansonia africana* (Theob.) Roberts Field; Harbel.

22. *Mansonia metallica* (Theob.) Roberts Field.
23. *Mansonia uniformis* (Theob.) Roberts Field.
24. *Megarhinus* sp. probably *brevipalpis conradti* Grünb. Roberts Field; Harbel.

The collection also includes unidentified species of *Ficalbia* (*Miomyia*) collected at Roberts Field.

### Tabanidæ

25. *Chrysops longicornis* Macq. Roberts Field.
26. *Tabanus besti* var. *arbucklei* Austen. Roberts Field; Harbel.
27. *Tabanus par* Walk. New record for Liberia. Roberts Field.
28. *Tabanus kingsleyi* Ricardo. Roberts Field; Harbel.
29. *Tabanus postacutus* Oldroyd. New record for Liberia. Roberts Field; Harbel.
30. *Tabanus tæniola* Palis. de B. Roberts Field.
31. *Thaumastocera akwa* Grünberg. New record for Liberia. Roberts Field.
32. *Hæmatopota furians* Edw. New record for Liberia. Roberts Field.
33. *Hæmatopota guineensis* Bigot. Roberts Field.

### Rhagionidæ

Unidentified species of *Suragina* collected at Roberts Field and Harbel.

### Asilidæ

Two new species, *Laphria* and *Ommatius*, collected at Roberts Field.

### Dorilaidæ

Unidentified species of *Dorilas* collected at Roberts Field and Harbel.

### Syrphidæ

34. *Baccha brevis* Karsch. Roberts Field; Harbel.
35. *Melanostoma annulipes* Macq. var. *mauritianum* Big. Roberts Field; Harbel.
36. *Microdon brevicornis* Loew. Roberts Field.
37. *Microdon punctulatus* Wied. Roberts Field.
38. *Paragus borbonicus* Macq. Roberts Field.

39. *Protylocera æsacus* Walker. Roberts Field; Harbel; Kakata.
40. *Protylocera dibaphus* Walker. Roberts Field; Harbel; Kakata.
41. *Rhingia cærulescens* Loew. Roberts Field; Harbel; Kakata.

The collection also contains unidentified species of *Tubifera* and two new species, *Eumerus* near *triangularis* Hervé-Bazin, and *Graptomyza,* collected at Roberts Field.

### Tephritidæ

42. *Ceratitis* (*Pardalaspis*) *giffardi Bezzi.* Roberts Field; Harbel.
43. *Ceratitis* (*Pardalaspis*) *punctata* (Wiedmann). Roberts Field; Harbel.
44. *Ceratitis* (*Trirhithrum*) *fraterna* Munro. Roberts Field; Harbel.
45. *Ceratitis* (*Trirhithrum*) *nigerrima* (Bezzi). Roberts Field; Harbel.
46. *Dacus armatus* F. Roberts Field; Harbel.
47. *Dacus punctatifrons* Karsch. Roberts Field; Harbel.

The collection also includes unidentified species of *Rhacochlæna* collected at Roberts Field.

### Glossinidæ

48. *Glossina fusca* Walker. Roberts Field; Reputa; Kolobanu.
49. *Glossina nigrofusca* Walker. Roberts Field; Memmeta.
50. *Glossina palpalis* Rob.-Desv. Roberts Field; Kolobanu; Lengatown; Banga; Reputa; Memmeta; Kakata.

## HYMENOPTERA

### Chalcidoidea

Unidentified species of *Brachymeria, Cleonymus, Philomides* and *Ptinobius* collected at Roberts Field.

### Braconidæ

Unidentified species of *Iphiaulax* collected at Roberts Field and Harbel.

### Ichneumonidæ

51. *Idechthis canescens* (Grav.) Roberts Field; Harbel.

The collection also includes unidentified species of *Anomalon, Charops, Enicospilus, Melanichneumon, Pristomerus, Xanthocampoplex, Xanthopimpla* and *Zaleptopygus* collected at Roberts Field.

### Tiphiidæ

52. *Tiphia pedestris* Gerst. Roberts Field; Harbel.

### Scoliidæ

53. *Campsomeris albicollis* (Chr.) Roberts Field.

The collection also contains unidentified species of *Scolia* collected at Harbel.

### Mutillidæ

54. *Timulla cyparissa* (Sm.) Roberts Field.

The collection also includes unidentified species of *Odontomutilla* collected at Roberts Field and Harbel.

### Chrysididæ

55. *Chrysis lyncea* F. Roberts Field; Harbel; Marshall; Kakata; Reputa.

### Formicidæ

56. *Dorylus* (*Dorylus*) *gribodoi* Emery. Roberts Field; Harbel; Monrovia; Salala.
57. *Dorylus* (*Anomma*) *nigricans* Illiger. Roberts Field; Harbel; Monrovia.
58. *Œcophylla longinoda* var. *fusca* Emery. Roberts Field; Harbel; Kakata.
59. *Paltothyreus tarsatus* (F.) Roberts Field.

The collection also contains unidentified species of *Crematogaster* collected at Roberts Field and Harbel.

### Pompilidæ

60. *Cyphononyx croceicornis* (Er.) Harbel.
61. *Paracyphononyx zonatus* (Ill.) Roberts Field.
62. *Pseudagenia personata* Grib. Roberts Field.

The collection also contains unidentified species of *Anoplius* collected at Roberts Field.

### Vespidæ

63. *Polistes marginalis* var. *ornatus* Lep. Roberts Field.
64. *Polybioides tabida* (F.) Roberts Field.
65. *Ropalidia cincta* (Lep.) Roberts Field.
66. *Belonogaster junceus* (F.) Roberts Field.
67. *Rygchium marginellum* (F.) Roberts Field; Harbel.
68. *Rygchium albonigrum* (J. Bequaert). Roberts Field; Harbel.
69. *Rygchium synagroides* (Sauss.) Harbel.
70. *Rygchium ventrale* (Sauss.) Harbel.
71. *Synagris calida* (L.) Harbel.
72. *Synagris cornuta* (L.) Roberts Field; Harbel; Marshall.
73. *Synagris spiniventris* (Ill.) Roberts Field; Harbel.

### Sphecidæ

74. *Chalybion fuscipennis* (Sm.) Roberts Field; Marshall.
75. *Chlorion xanthoceros* (Ill.) Roberts Field; Harbel; Marshall.
76. *Motes crœsus* (Sm.) Roberts Field.
77. *Sceliphron spirifex* (L.) Roberts Field; Harbel; Marshall; Kakata; Salala.
78. *Sphex,* near *indutus* (Kohl). Roberts Field; Harbel; Marshall.

The collection also includes unidentified species of *Cerceris, Dasyproctus, Hoplisoides, Trypoxylon* and *Bembix* collected at Roberts Field. The last named specimen was also found at Kakata, Reputa and Salala.

### Apidæ

79. *Trigona erythra* Schlett. Tototown; Salala.
80. *Trigona erythra togœnsis* Stad. Tototown; Salala.
81. *Trigona* (*Dactylurina*) *staudingeri* Grib. Roberts Field; Harbel.
82. *Anthophora cincta* F. Roberts Field; Harbel.
83. *Mesotrichia albiceps* (F.) Reputa; Salala.
84. *Mesotrichia gabonica* Vach. Roberts Field; Harbel.
85. *Mesotrichia imitator nigriceps* Friese. Roberts Field.

86. *Mesotrichia modesta* (Smith). Roberts Field; Harbel.
87. *Mesotrichia præusta* (Smith). Roberts Field.
88. *Mesotrichia torrida* (Westw.) Roberts Field; Harbel.
89. *Pasites nigerrima* Fr. Roberts Field.
90. *Euaspis abdominalis* (F.) Roberts Field; Harbel.
91. *Gronoceras prætexta* (Vach.) Roberts Field; Harbel; Marshall.
92. *Megachile crocutella* Ckll. Roberts Field.
93. *Megachile rufipes* (F.) Harbel; Reputa.
94. *Pachyanthidium xanthostomum* Ckll. Roberts Field.

The collection also contains unidentified species of *Xylocopa, Crocisca* and *Halictus* collected at Roberts Field and Harbel.

## COLEOPTERA

### Carabidæ

Unidentified species of *Anisodactylus, Craspedophorus, Ochyropus, Orthogonus* and *Pheropsophus* collected at Roberts Field.

### Hydrophilidæ

Unidentified species of *Sternolophus* collected at Roberts Field.

### Staphylinidæ

Unidentified species of *Pæderus* collected at Roberts Field.

### Histeridæ

Unidentified species of *Hister* collected at Roberts Field and Harbel.

### Lycidæ

95. *Lycus latissimus* (L.) Roberts Field.
96. *Lycus sinuatus* Dalm. or *semiamplexus* Murray. Roberts Field.

The collection also includes unidentified species of *Speckia* collected at Roberts Field.

### Meloidæ

Unidentified species of *Zonabris* and *Zonitis* collected at Roberts Field and *Epicauta* found at Reputa.

### Coccinellidæ

97. *Cheilomenes axillaris* Ws. Roberts Field; Harbel.
98. *Chilocorus schiœdtei* Muls. Roberts Field; Harbel.
99. *Epilachna assimilis* Muls. Roberts Field; Harbel.

### Tenebrionidæ

100. *Odontopus cupreus* F. Roberts Field.

The collection also contains unidentified species of *Eupezus, Opatrinus* and *Prioscelis* collected at Roberts Field and Harbel.

### Lagriidæ

Unidentified species of *Lagria* collected at Roberts Field.

### Scarabæidæ

101. *Odoretus luteipes* Cast. teste Ohaus. Roberts Field; Harbel.
102. *Anomala discordabilis* Dohrn. Roberts Field.
103. *Anomala imarginata* Ohs. Roberts Field.
104. *Archon centaurus* (F.) Roberts Field; Harbel.
105. *Diplognatha gagates* (Forst.) Harbel.
106. *Heteroligus meles* Bilb. Roberts Field.
107. *Incala lineola* Westw. Roberts Field.
108. *Oryctes monocerus* Ol. Roberts Field; Harbel.
109. *Pachnoda marginata* Drury. Roberts Field; Harbel.
110. *Pachnoda tridentata* (F.) Roberts Field; Harbel.

The collection also includes unidentified species of *Apogonia, Eulepida* and *Trochalus* collected at Roberts Field and Harbel.

### Lucanidæ

Unidentified species of *Prosopocoilus* collected at Roberts Field.

### Cerambycidæ

111. *Acanthophorus (Tithoes) palini* Hope. Owen's Grove.
112. *Monochamus ruspator* (F.) Owen's Grove.
113. *Sternotomus regalis* (F.) Roberts Field.

The collection also contains unidentified species of *Callichroma* and *Euporus* collected at Roberts Field.

### Chrysomelidæ

114. *Callispa* sp. near *nigripes* Baly. Roberts Field.
115. *Cryptocephalus* sp. perhaps *dregei* Suffr. Roberts Field.
116. *Galerucella geniculata* Harold. Roberts Field.

The collection also includes unidentified species of *Aspidomorpha*, *Hispa* and *Monolepta* collected at Roberts Field and Harbel.

### Anthribidæ

117. *Gynandrocerus antennalis* Lac. Harbel.
118. *Polycorynus* sp. probably *compressicornis* F. Roberts Field.

The collection also includes unidentified species of *Phlœtrogus* collected at Roberts Field.

### Curculionidæ

119. *Rhynchophorus phœniciensis* F. Roberts Field; Harbel.
120. *Sipalinus guineensis* (F.) Roberts Field.
121. *Temnoschoita quadripustulata* (F.) Roberts Field.

The collection also contains unidentified species of *Lixus*, *Mechistocerus* and *Protocylas* collected at Roberts Field.

## ORTHOPTERA

### Blattidæ

122. *Leucophœa grandis* (Sauss.) Roberts Field.
123. *Periplaneta australasiæ* (F.) Roberts Field; Harbel.

### Gryllidæ

124. *Gryllotalpa africana* Beauv. Roberts Field; Harbel.

## DERMAPTERA

### Forficulidæ

125. *Diaperasticus erythrocephalus* (Oliv.) Roberts Field; Harbel.

### Labiduridæ

Unidentified species of *Eurollia* collected at Roberts Field.

## ISOPTERA

### Termitidæ

126. *Macrotermes bellicosus* (Smeathman). Roberts Field; Kakata; Salala; Reputa; Harbel.

## SIPHONAPTERA

### Pulicidæ

127. *Ctenocephalides canis* (Curtis). Roberts Field; Kakata; Harbel; Monrovia.

## NEUROPTERA

### Myrmeleonidæ

128. *Palpares manicatus* Rambur. Roberts Field; Harbel.

SUMMARY TABLE

| *Orders* | *Families* | *Genera* | *Species* | *Determined* | *Undetermined* |
|---|---|---|---|---|---|
| Diptera | 14* | 43 | 71 | 50 | 21 |
| Hymenoptera | 12 | 55 | 69 | 44 | 25 |
| Coleoptera | 15 | 55 | 56 | 27 | 29 |
| Orthoptera | 2 | 3 | 3 | 3 | 0 |
| Dermaptera | 2 | 2 | 2 | 1 | 1 |
| Isoptera | 1 | 1 | 1 | 1 | 0 |
| Siphonaptera | 1 | 1 | 1 | 1 | 0 |
| Neuroptera | 1 | 1 | 1 | 1 | 0 |
| 8 | 48 | 161 | 204 | 128 | 76 |

* The following families were not listed because of undetermined specimens: Empididæ, Therevidæ, Dolichopodidæ, Otitidæ, Piophilidæ, Phoridæ, Milichiidæ, Pyrgotidæ, Stratiomyidæ, Drosophilidæ and Diopsidæ.

## ACKNOWLEDGMENTS

The writer is indebted to Mr. C. F. W. Muesebeck and staff of the Bureau of Entomology and Plant Quarantine for aid in determining the specimens. Dr. Alan Stone determined the Culicidæ. Dr. Joseph Bequaert, Curator of Insects, Museum of Comparative Zoology, Harvard College, revised the Tabanidæ and Vespidæ.

# A NEW GENUS AND SPECIES OF DAMSELFLY FROM SOUTHERN HAITI (ODONATA)*

By Kenneth A. Christiansen
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The new species herein described was collected by Dr. Marston Bates in September, 1934, at an altitude of 4,000 feet in the Laselle Mountains of Southern Haiti. It represents a strikingly new addition to the Neotropical fauna. Every external characteristic appears to point toward a relationship with the family Synlestidæ, and the penes have a remarkable resemblance to the penes of the African genus *Chlorolestes;* however, until the nymph has been uncovered, any family classification must remain a tentative one. Both Tillyard[1] and Lieftinck[2] have shown that the final court of appeal as to members of this family is the nymph. If we place this genus in the Synlestidæ, using Tillyard's divisions (*op. cit.*), it runs out to the subfamily Synlestinæ. This would bring the genus between the African *Chlorolestes* and the Australian *Synlestes.* The evidence of the penes and the venation seems to bear this out. If this genus is, as it appears to be, closest to *Chlorolestes*, this would mark another appearance of a new genus in the Neotropics whose closest ally is an African genus.[3] In both genera the types were captured at high altitudes.

## **Phylolestes,** new genus

Wings long and narrow, about seven times as long as wide. Petiolation ends well before the level of the quadrangle in both wings. In the fore wings Ac[4] is well distad of the level of petiolation and is opposite the midpoint between the two antenodals. In the hind wings Ac is

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* Published with a grant from the Museum of Comparative Zoölogy at Harvard College.

[1] Tillyard & Fraser, Aust. Zool. 9(2), pp. 15–30, Nov. 1938.

[2] Lieftinck, Treubia 17, pp. 45–61, March 1939.

[3] Needham, J. G., Amer. Mus. Novitat. No. 1081, July 17, 1940.

[4] Venational terms used in this paper are those of Tillyard and Fraser (*op. cit.*) except that Discoidal cell of Tillyard = Quadrangle.

slightly distad of the level of petiolation and is closer to the second antenodal than to the first; second antenodal on a level with the arculus; quadrangle strongly acute with the proximal side as long as, or longer than, anterior side; subquadrangle separated from the wing margin with this separation more marked in the fore wing; anal bridge arises distally directly from the distal angle of the quadrangle in the hind wings, and originates slightly below the quadrangle in the fore wings; vein Cu P swings up sharply on leaving the quadrangle; R4 plus 5 arises closer to the subnodus than to the arculus, and more than one cell before the subnodus; nodus located $\frac{1}{3}$ of the distance from the base to the distal end of the wing; IR3 arises at subnodus; IR2 is deflected strongly toward the stigma; at least one true[5] sector between IR2 and R3, rising proximad to the level of the stigma; no oblique crossvein between R3 and IR3. Superior male abdominal appendages forcipate, inferiors rudimentary and plate-like. Penis typically Synlestine, lacking a terminal lobe and possessing a visible median spine.

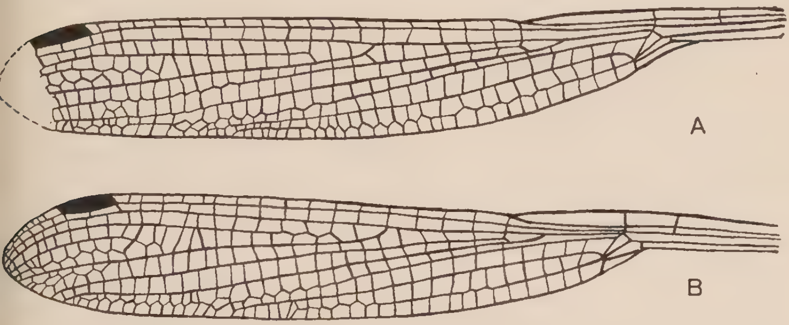

Fig. 1. Left fore (A) and hind (B) wings of *Phylolestes ethelæ* n. g. and n. sp., holotype. × 2.5.

The genus *Phylolestes* is very close in the shape of the penes to the African genus *Chlorolestes;* however, it may easily be separated from this genus by the venation and the shape of the inferior abdominal appendages. In

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[5] For the purposes of this paper a "true" sector is one which is straight for at least five cells length.

*Chlorolestes* the anal bridge originates distally well down the vein descending from the quadrangle in both wings, and joins the wing margin well before reaching Ac; Ac is opposite, slightly distad, or slightly proximad of, the level of the first antenodal; the wings are petiolated to, or nearly to, the level of the quadrangle; and the inferior abdominal appendages have a heavily sclerotized spiniform area. In *Phylolestes* the anal bridge starts at, or very close to, the distal angle of the quadrangle and runs into Ac before reaching the wing margin; Ac is opposite the midpoint between the first and second antenodals or closer to the second antenodal; the wings are clearly not petiolated to the level of the arculus; and the inferior abdominal appendages lack any heavily sclerotized area.

The distal origin of the anal bridge is similar to a condition found in the Australian genus *Synlestes,* while the condition of Ac resembles that of the Oriental *Megalestes;* but a separation of these three genera may easily be seen by an examination of the penes and a comparison of the venation.

Genotype.—*Phylolestes ethelæ.*

### **Phylolestes ethelæ,** new species

Synlestine in appearance with moderately slender body; coloration metallic green, bronze and black.

Male.—Fore wing 38 mm.; hind wing 36 mm. Head (across eyes) 7 mm. Thorax plus prothorax[6] 9.5 mm. Abdomen, including the abdominal appendages, 56 mm. Greatest diameter abdominal segment 2 (excluding appendages) 2 mm., of segment 6, 1 mm., and of segment 9, 1.8 mm. Abdominal appendages 2 mm. long. Hind femur 6 mm., hind tibia 6 mm., mesothoracic femur 4.5 mm., mesothoracic tibia 5 mm., prothoracic femur 4 mm., prothoracic tibia 5 mm.

*Head.*—Labium obscure yellow, darker at its forward edge and cleft for more than $\frac{2}{3}$ its entire length. Labrum shiny black. Genæ and postgenæ yellow. Anteclypeus dull yellow, postclypeus metallic green. Frons and ver-

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[6] Measurements for thorax plus prothorax taken at greatest length from base of head to abdominal segment 1.

tex metallic green. Ocelli black. Occiput bronzy. Eyes (in dried specimens) brown. Basal segment of antennæ with pale ring around distal half, remainder of antennæ black. Rear of head black with metallic green reflections.

*Prothorax.*—Anterior lobe dull brown edged with yellow. Lateral lobes dull yellow along inferior edges. Remainder of lateral lobes and the middle lobe dull bronze. Posterior lobe ridged and slightly curved along posterior margin. Posterior margin with a central roughly lunate depressed area. Color of posterior lobe dull bronze. Mesostigmal laminæ terminate on both sides at the anterior end of the humeral suture in a low barely acute angled lobe.

*Thorax.*—Mesepisternum black with metallic green reflections, an indistinct brown stripe originating at the humeral suture above and curving inward and down to the collar. A narrow yellow stripe along the humeral suture running from the mesinfræpisternum almost to the wing bases. Mesepimeron with small triangular yellow spot inferiorly tangent with mesepisternal yellow stripe. Remainder of mesepimeron brown with metallic green reflections rearward with the brown narrowing inferiorly. Metepisternum with a yellow hairline along 1st lateral suture bordered by brown. A yellow stripe extends

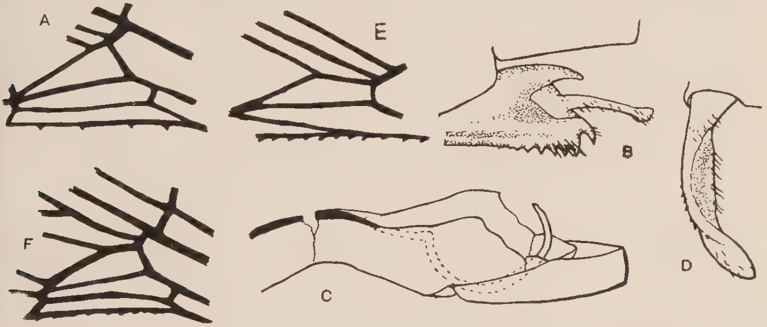

Fig. 2. A–D, *Phylolestes ethelæ* n. g. and n. sp., (A) area of quadrangle in left fore wing of holotype; (B) right genital valve of allotype in side view; (C) penis of holotype in side view; (D) left superior abdominal appendage of holotype in dorsal view. E, *Chlorolestes fasciata* Burmeister, area of quadrangle in left fore wing. F, *Megalestes major* Selys, area of quadrangle in left fore wing. All figures enlarged.

along the second lateral suture. The remainder of the thorax is dull brown fading to yellow posteriorly. Ante-alar sinus black.

*Wings.*—Postnodals in fore wing 18–?,[7] hind wings 16–16; R3 arises five and one-half crossveins distad of subnodus in fore wing and four to four and one-half in the hind wings. Stigma somewhat trapezoidal and three times as long as broad; proximal vein strongly angulate. The stigma covers two cells with brace vein slightly distad of the proximal end of the stigma.

*Legs.*—Coxæ yellow, femora and tibiæ light brown darkening towards the joints. Tarsi and claws black. Claws with a definite basal tooth. Spines short and stout on the femora; a little longer than the intervening spaces on the base of the tibia, decreasing in length toward the tarsi.

*Abdomen.*—The dorsum of segment one yellow basally, the remainder of the dorsum black with metallic green reflections, decreasing posteriorly. Ventrum obscure yellow. Anterior genital hamules roughly rhomboidal, yellow with black posterior edges. Superior abdominal appendages black, forcipate and simple, without any prominent spines or teeth. Inferiors rudimentary, consisting of small semicircular plates, dark brown in color.

FEMALE.—Length of fore wing 41 mm., hind wing 39 mm.; abdomen 46 mm. long and somewhat stouter than that of the male. Other measurements as in holotype.

*Head.*—As in holotype.

*Prothorax.*—Similar to the holotype except that the middle lobe is irregularly edged with black and the lateral lobes are inferiorly pruinose.

*Thorax*, ante-alar sinus, and mesostigmal laminæ as in holotype.

*Wings.*—Similar to holotype except as follows: stigma covers three cells in the fore wing and is not so strongly trapezoidal, with the proximal vein being more nearly parallel to the distal vein. Brace vein is in line with the proximal bordering vein. Stigma three times as long as broad. Postnodal crossveins: fore wings, 19–18; hind wings, 15–15.

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[7] Right fore wing of holotype is missing.

*Abdomen.*—Brown with metallic green reflections, blackening towards the terminal segments. Genital valves deeply serrate with the serrations recurved and increasing in size posteriorly. Ovipositor small and completely hidden by the valves.

Holotype male, allotype female, 1 broken teneral male and 1 female paratypes, vicinity of La Visite, Laselle Mts., Haiti, 4,000 ft. (Marston Bates). Museum of Comparative Zoölogy, No. 27733.

Not included in the type series is another male from the neighboring La Hotte range of Southern Haiti. This specimen has several differences from the Laselle specimens; however, the penis of the La Hotte specimen was badly damaged and in the portions remaining no differences were detected between it and the holotype. The observed variance between the other features is as follows:

| Holotype | La Hotte male |
|---|---|
| Length—69 mm. | Length—58 mm. |
| Fore wing 33 mm. long | Fore wing 36 mm. long |
| Hind wing 38 mm. long. | Hind wing 34 mm. long. |
| Postnodal crossveins | |
| Fore wing 18–? | Fore wing 19–18 |
| Hind wing 16–16 | Hind wing 14–14 |

The thoracic and abdominal markings are similar, but the metallic green is more pronounced in the La Hotte specimen, and the brown colors on the thorax of the holotype become metallic bronze on the La Hotte male. The abdominal appendages are similar except for a small knob on the dorso-interior surface which appears only in the La Hotte specimen.

The poor condition of the La Hotte specimen and the small amount of available material make it impossible to say whether this La Hotte male represents another species of the new genus or only the normal variation for a species living in highly isolated areas.

I wish to extend my sincere thanks to Dr. Bequaert, Curator of Insects at the Harvard Museum of Comparative Zoölogy, for allowing me to study the material and for the aid which he furnished me during my study. I also wish to thank Mrs. Leonora K. Gloyd who read this paper and gave me many helpful suggestions about it.

Note on the Type Specimen of Bagous sellatus Leconte (Coleoptera: Curculionidæ).—Leconte's description of *Bagous sellatus* (Rhync., p. 184) mentions that the elytra have "the striæ deep, interspaces convex, first, third, and fifth more elevated, the last terminating in a large conical tuberosity, which is surrounded by a black cloud." Blatchley (Rhync. N. E. Am., p. 236) redescribes the species and states, "sides and tips of elytra ash-gray, leaving a large, elongate triangular space black."

In 1942, when examining the type for Prof. Tanner, the present author subjected the specimen to degreasing in order to see the structural characters more easily. At this time the black cloud or spot disappeared, indicating that it had been merely an oil spot. It had been so symmetrical that it had misled both discriminating students. The description stands on the basis of structural characters, the specimen now being entirely ash-gray. Any further specimens placed in this species because of possessing a black spot will undoubtedly turn out to be of another species.—Floyd G. Werner, Biological Laboratories, Harvard University.

# A NEW STICTOPONERA, WITH NOTES ON THE GENUS (HYMENOPTERA: FORMICIDÆ)

By William L. Brown, Jr.
Biological Laboratories, Harvard University

Among ants collected in Western China during the years 1944 and 1945, I have two specimens of a new *Stictoponera* collected on a high, sharp ridge near Chao Kung Mountain and about one and one-half days' travel afoot west of Kuanhsien, Szechuan Province, China. The elevation was between 5000 and 7500 feet, probably closer to the higher altitude, in the zone of dense bamboo growth. The ants were taken together in the thin bamboo humus at the ridge summit. They moved very slowly, and resembled our species of *Proceratium* in their sluggish locomotion and in feigning death at the approach of danger.

## **Stictoponera panda** new species

*Holotype worker.* Size, excluding mandibles, 5.2 mm. Length of thorax, Weber's measurement, 1.8 mm. Closely related to *taivanensis* Wheeler in possessing a high petiolar node with steep anterior and posterior faces. It differs from *taivanensis* mainly in its larger size, broader head (cephalic index, or greatest breadth of head expressed as a percentage of greatest length, mandibles excluded, is 93) and its different sculpture and color. The posterior corners of the head are also a little more acute. The eyes small, like those of *taivanensis,* with 6 to 8 ommatidia in the greatest diameter, placed near the middle of the sides of the head.

The frontal carinæ are slightly farther apart, and the longitudinal costulæ arising between them and continuing back across the vertex are finer and more numerous (four distinct costulæ in *taivanensis,* at least twice that many in *panda,* the more laterally placed costulæ with scattered shallow pits separating them). Clypeus very finely longitudinally striate, its median groove shallow and not bounded by definite carinæ laterally, somewhat shining. The declivity of the epinotum much less distinctly margined, the epinotal teeth obsolete, cross-rugæ on the face of the declivity much reduced and less distinct. For the rest, the sculpture is quite similar to that of *taivanensis*, but throughout lower and less distinct, especially of the dorsum of the thorax and first gastric segment.

Pilosity slightly shorter, more delicate and more abundant than in *taivanensis*. Color deep reddish ferrugineous, the node of the petiole slightly infuscated, antennæ and mandibles lighter, legs still lighter and more yellowish.

*Holotype worker.*—Taken near Chao Kung Mountain, west of Kuanhsien, Szechuan Province, China, Sept. 4, 1945. (W. L. Brown, Jr.) Type to be deposited in the Museum of Comparative Zoology.

*Paratype worker.*—One specimen. Total length excluding mandibles, 4.8 mm. Cephalic index, 92. Length of thorax, Weber's measurement, 1.7 mm. Otherwise quite similiar. This specimen collected with the holotype to be deposited in the U. S. National Museum.

This species is presumably different from *binghami* Forel, of which I have not seen specimens, in the size of the eyes, in sculpture, and in the shape of the petiole. *Binghami* is from Lower Burma, *taivanensis* from Formosa.

### *Stictoponera menadensis* subsp. *minor* Forel

This form has been listed as a variety of subsp. *bicolor* Emery, from which it differs so markedly in color, if the specimen from Dong Mo, Indo-China is any criterion, that it should be regarded at the very least as of subspecific rank. This specimen, collected by Silvestri and now in the Wheeler Collection at the Museum of Comparative Zoology, is similar to *bicolor* in size and sculpture, but is a very light tannish-yellow in color, the gaster very slightly darker. The first funicular joint is more slender than in the Wheeler Collection specimens of *menadensis* Mayr or its subsp. *bicolor*.

Another series of workers from Borneo in the Wheeler collection are large for *Stictoponera*, ferrugineous red, and have the second gastric segment strongly costate. The genus is in such confusion that I am afraid of describing them as new without reliable examples of *costata* Emery, to which they are probably most closely related.

# THE HABITAT OF ÆNIGMATIAS (DIPTERA: PHORIDÆ)

By C. T. Brues

Biological Laboratories, Harvard University

The sexes of the interesting genus *Ænigmatias* like those of many Phoridæ are extremely dissimilar owing to the apterous condition and otherwise profoundly modified and degenerate form of the female. Three species, known from the winged male have been found in North America. The female of one of these is known, definitely associated with the male from a pair taken *in copula* by Malloch and described by him as *Ænigmatias flavofemorata.* Malloch's types were from Illinois, collected "on a sandy bank along the Illinois Central Railroad between White Heath and the Sangamon River." As the genus is known definitely to be myrmecophilous, at least in Europe, the specimens taken by Malloch were quite probably from the nest of some ant in the vicinity. Previous to this a single female was taken in Arizona by Coquillett and described by him as *Æ. schwarzii.* Of this he says "it occurred on low vegetation in a locality where no ant nests could be found."

During the summer of 1945, the present writer collected a large number of miscellaneous insects on sheets of "tanglefoot" fly-paper in northwestern Massachusetts while making a census of insects to determine the effect of DDT on the insect fauna of woodlands. Among the more than 300,000 specimens obtained (of which some 51% were Phoridæ) was a single female of *Ænigmatias* from Petersham, August 4. This, which is apparently the third female to be reported from North America, was trapped on the trunk of a tree several feet above the ground. From this, and from the experience of both Coquillett and Malloch it is apparent that these tiny wingless *Ænigmatias* wander freely from the ant nests where they are domiciled, perhaps following foraging ants. This specimen is not sufficiently well preserved to determine whether it is *Æ. flavofemorata,* or more probably, *Æ. eurynota* Brues known from a male collected in 1910 by Mrs. Brues at Forest Hills, Massachusetts.

# SOME CHARACTERS IN THE PERLIDÆ*

By Nathan Banks
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Many years ago when I started to classify our Perlidæ I neglected to study the head, antennæ, and legs. In recent years others have emphasized the importance of genitalia and nymphal structure. Species are physiological units, genera are structural units. Reproduction is one of the most important physiological processes, so that the structure of the genital parts is of great value in species. These vary from species to species so that only in a general way can they be used for genera. If the genus is to be something different from the species, it must rest on characters which are not commonly used for species. Species reflect adaptation to environment, the recent and temporary life. Genera should rest on long-inherited structures, of little or no use to the adult, but which reflect heredity; characters common to several species.

The wings of *Pteronarcys* and *Isoperla* have many differences, but for each genus the wing is efficient; the great number of crossveins in the former genus is not necessary, they represent inheritance, not use, and so become of value in the classification of genera or higher groups.

Of the several structures that I have observed, the anal lobe of the fore wings[1] and a vein (anal brace), arising from the under side of the anal cell, and crossing the anal lobe seem to me to represent the course of specialization. In *Pteronarcys* the anal lobe is very large and the anal brace (vein that crosses it) complete and strong. In

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* Published with a grant from the Museum of Comparative Zoölogy at Harvard College.

[1] This anal lobe is rarely shown in figures of wings. Figure I in Needham and Claassen shows the anal area of fore wing but does not indicate the line of fold which separates the anal lobe from the rest of the wing. Many figures indicate the anal brace but often only partially or incorrectly. In the Selys part one, Klapalek on page 6 shows line of fold, in part 2, page 9, he shows the anal brace. N. & C. on plates 13 and 16 show the anal brace in *Perla* and *Acroneuria*.

Figures 1 to 8 I have indicated the gradual modification until it vanishes in *Peltoperla.* In *Pteronarcys* the anal brace extends obliquely backward (recurrent). Other general with an oblique recurrent anal brace are *Acroneuria, Togoperla, Banksiana, Neoperla, Perlesta, Pteronarcella, Harrisiola,*[2] *Perlinella.*

In *Isogenus* the anal brace arises closer to the base of the anal cell and extends transversely to the margin; other genera in this group are *Perlodes, Clioperla, Hydroperla.* Those in which the anal lobe is very small and folded under and the brace vestigial are *Isoperla, Paraperla, Diploperla,* some species placed in *Clioperla* (I am not sure of genotype). In *Atoperla* there is a very short basal part of anal brace arising before base of anal cell, often difficult to determine. In many cases the outer part of anal brace is weaker than basal part. In some species of *Isoperla* the lobe and brace are very small and weak or absent, in few distinct. In five genera the lobe and anal brace are absent: *Peltoperla, Alloperla, Chloroperla, Kathroperla,* and *Hastaperla.* In *Perlesta,* and sometimes other forms, the anal brace is bent at the line of fold.

## ANTENNÆ.

The antennæ in Perlidæ are rarely mentioned except to note the color. Walker, in the descriptions of two species (*decolorata* and *decisa*) says antennæ "very minutely pubescent" and "brown, minutely pubescent."

The antennæ of *Pteronarcys* and *Acroneuria* have joints near the base very short and broad, some, at least immovable; in *Togoperla immarginata* it is similar. In *Perlodes* the joints near base are usually longer, but still broader than long; also in *Isogenus* and *Hydroperla.* In many of the species placed by Needham and Claassen in *Perla* and *Clioperla* the third joint is plainly longer than the fourth, the latter and several following joints being much broader than long. In this type of antennæ the joints are not narrowed at base until much further out where the joints are much longer than broad. In *Pteronarcella* the joints become longer than broad much sooner. In all of these the hairs on the antennæ are very small and fine, well described as "minutely pubescent." Often they are erect, but in some slope toward tip of joint. In *Togoperla* the hairs, though longer, are closely appressed; in *Perlinella,* though short, are also appressed.

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[2] *Harrisiola* (type *Perla flavescens* Walsh). I use this name for the species (except type) that were put by Klapalek in *Neophasganophora;* the type species being a *Perla.*

In the genotype of *Isoperla* (*bilineata*) the joints near base are as long as broad, the hairs are very short, but near the tip or beyond the middle is a longer erect hair, which I shall call a sense hair. In other species of *Isoperla* it is the same, but a few (*ebria*) that have sometimes been placed in *Isoperla* do not have these sense-hairs, or at least not well-developed. In *Alloperla,* in *Perlesta,* it is the same as *Isoperla.* In *Neoperla* the hairs are longer but the sense-hairs are very prominent, also *Diploperla, Paraperla,* and *Kathroperla,* as well as *Chloroperla* and *Hastaperla* have them more or less distinct.

In *Isogenus* and *Perlodes* there are no sense-hairs or else so small as to be unnoticed, in *Hydroperla* some species show very tiny erect hairs toward the tip of the joint, but in others they are very small or absent, in some *Diploperla* they are also short, but usually distinct and near tip of joint, in *Clioperla* (*similis, slossonæ*) they are readily seen. In some *Acroneuria* (*xanthenes, californica*) the sense-hairs are fairly distinct, beyond the short joints, in others they are obscure or absent. In the *Perlinæ* distinct, but not as prominent as in *Neoperla.*

## HEAD.

In shape the head ranges from twice as broad as long (*Peltoperla*) to twice as long as broad (*Paraperla*); and behind the eyes the head may extend more than twice the diameter of the eye (*Kathroperla*) or there may be scarcely any space at all (some *Hydroperla*).

The head may be considered as of three areas: occipital area, the part behind eyes and ocelli; the interocular area, and the face or area in front of anterior ocellus. The occipital area is often very short in middle, where it is separated from the interocular area by a curved line or groove, the occipital line, the ends of which curve forward. Just behind the eyes the head usually narrows toward the pronotum, but in a few forms (*Perlodes, Atoperla*) the side at first bulges outward before it starts to narrow. In the middle there is frequently a line or groove from the occipital line to the rear of head; this median groove is present in *Perlodes, Isogenus, Clioperla,* some *Isoperla,* also in *P. nona* and *obscura.* It is short or hidden in *Perla* (*Togoperla*), *Acroneuria, Harrisiola, Perlinella, Perlesta, Atoperla, Alloperla,* but is present in *P. luctuosa, P. modesta* and *P. phalerata.* It is present in some very small species as *P. ebria.* In *Hydroperla* it is not present, at least in sight, but sometimes a small groove on the hidden part of head or as a very fine line.

The occipital line is usually quite distinct in the primitive forms; in the more specialized it may show behind the hind ocelli, or be entirely obliterated. In *Perlodes* it slopes each side and ends in front of eyes; in *Perliphanes* it slopes less and runs into lower part of eye; in *Perla* and *Acroneuria* it slopes each side just outside of boss and is stopped by a ridge. In *Calliperla* it slopes each side a little concavely to a point near eye where it connects with a line sloping below inwardly, the outer part of the M-mark. In *Harrisiola* and *Atoperla* it makes a full semicircle, the ends running into the boss; in *P. modestus* it makes a broader curve, also ending in the boss each side, but not a full semicircle. In *Isogenus* it is lower and broad, stopping near boss. In *Perlinella* the sides disappear a little beyond boss. In *Perlesta* it connects top of ocelli, beyond vestigial. In *Isoperla* it sometimes shows sloping from behind the hind ocelli toward the eye, but more often it is not visible.

The interocular area has the three (or two) ocelli. They form a triangle as long or longer than broad in *Perla, Acroneuria, Harrisiola,* and some *Perlodes;* in *Isogenus, Pictetia,* many *Clioperla* and *Isoperla* the triangle is broader than long or at least as broad.

The hind ocelli are usually situated at about the middle of the eye-space; in *Perlinella* and *Kathroperla* a little behind eyes, in *Alloperla* further back than usual, and sometimes behind the eyes. In *Isogenus, Hydroperla, Clioperla* and some related species the hind ocelli look more or less laterally from the head of a broad groove, there being a ridge on their inner edge as high as the ocelli; in *Isoperla* the hind ocelli look more upward; in *Acroneuria, Alloperla, Harrisiola* the hind ocelli project above the surface of the head. The distance of the hind ocelli from the eyes is, at most, only a character of species.

In nearly all Perlids there is a small swollen spot a little in front of each hind ocellus, and often further out. This is the lateral tubercle or boss. It is more or less characteristic in shape and position for each species. Sometimes hardly further than the diameter of the ocellus, again it may be five to ten times as far away. In a few cases it is circular, but usually longer than the ocellus, and one end may be enlarged, or narrowed at outer end. In front of the anterior ocellus is the face.

There is usually a transverse groove or a depressed spot in front of the anterior ocellus. In front of this there is on each side a smooth area, or raised area, usually elongate and sloping outward; frequently they are pyriform. These are the middle part of what Needham calls the M-mark; however it is better called the V-mark, since the outer sides are faint or absent in most species. Sometimes the two are joined together above in a broad curve. They never reach the front margin of head, and near each lateral corner may be a dark rounded spot. The shape and divergence of the V-mark are very good characters for species and species-groups. But sometimes widely separated genera may have the V-mark of very similar shape. I have figured a number of these, and I think they should be considered in descriptive work.

In some species the head is without marks, or only dark around the ocelli, but in many there is a pattern of dark marks, which has long been recognized of specific value. There is, of course, variation in the development of a pattern. When the same pattern occurs in two or more species, there are differences in structure; often in shape of the ocellar triangle or on the lower face.

The head of *Perlodes,* when viewed from above, shows the side behind each eye somewhat swollen before it begins to slope inward. Behind the eye of *Isogenus* the side is, at first straight, then slopes inward; in *Hydroperla* it is less distinct, since the head is shorter behind the eyes, but in *ebria* and *gravitans* (?) the side is plainly prominent before sloping. The last two species, when viewed from below, show a somewhat globose area behind the eye. In many species the side behind eye is convex, but it begins to slope at the eye. *Perlinella* and *Calliperla* show the side somewhat swollen before the slope.

### FEMORA.

The femora have on their lower edge a row of short, fine hairs or the hairs may have above them a row of stouter bristles, or the hairs may be more numerous and spreading up on the lower part of the femur, and with bristles interspersed or in a row. Those with the row of short fine hairs are the genera *Perlodes* (and subgenera), *Isogenus, Hydroperla, Clioperla* and *Isoperla,* the other genera have bristles besides the hairs. In the *Perla* and *Chloroperla* sections there are always bristles on the femora, either in a row or among the hairs.

In shape the femora may be very long and slender, with nearly parallel sides, but in many of the genera with bristles among the hairs (*Perlesta, Neoperla,* Calliperlinæ) the femora are shorter, broader, and the upper edge convex.

### WINGS.

Needham and Claassen in the table to species of Perla use the position of the cubito-anal cross-vein to divide the genus in two sections, one in which this cross-vein is placed its length beyond the end of anal cell, and the other where the cross-vein is at end of cell or only a trifle beyond. In general it would be better to divide whether the cross-vein is at or before end of anal cell, or plainly beyond. The amount beyond varies a bit in some species. It is plainly beyond in *Isogenus, Hydroperla, Perlodes, Perlinella.* In *Pteronarcys* this vein is much beyond end of cell, so we may consider this a primitive character.

However in *Isoperla* both ways occur commonly, even sometimes in the same specimen.

One point in venation is very interesting, it is the forking of the cubital vein in fore wings; in all but two subfamilies the cubitus forks in such a way that the anterior branch diverges at least a little, but plainly, from the main stem while the lower branch either runs out nearly as a continuation of the stem or also diverges from the stem, so if stem were continued it would divide the fork. In two subfamilies, the Isoperlinæ and the Chloroperlinæ the upper branch runs out as a continuation of the stem and the lower branch definitely diverges from the stem. These two subfamilies, although having much general resemblance, differ so much in details of structure that this similarity in forking of cubitus may be the result of similar needs for strengthening the flight structure.

In the primitive forms there are more costal crossveins, and more branches to the radial sector than in more specialized forms, but the result is not constant, but highly variable. One point is of interest, the origin of the radial sector is usually a little beyond the end of the first anal vein, if one moves further out so does the other, *Perlinella* having both points further out than in *Perlesta*. However in *Perla immarginata*, in *Perlinella*, sometimes in *Acroneuria* the radial sector arises before end of anal vein, and in *Hydroperla* and *Calliperla luctuosa* often opposite. The position of the cord, is usually at beginning of outer third, of wing; in *Perlesta, Calliperla,* some *Acroneuria* it is before end of second third, while in *Perlinella,* and in some *Clioperla* it is beyond end of second third.

In the more primitive genera the subcosta extends out to the cord or near it, and in a few, *Acroneuria, Perlodes, Perla,* it may extend beyond the cord. In *Isogenus, Calliperla, Harrisiola, Peltoperla, Atoperla,* and *Kathroperla* it reaches the cord, or nearly so. In *Alloperla, Paraperla, Isoperla* the subcosta ends well before the cord. Sometimes it may fade out or be very indistinct as in *Nanoperla* and *Perlesta* (some species).

The number of veins in the anal area of the hind wings is normally five, *Paraperla* has but four, *Alloperla* three, and *Hastaperla* has no anal area. In most genera the second and fifth are branched, in some *Acroneuria* and *Perla* with several branches.

In the hind wings the number of cubital cross-veins, if more than one, has been used, it varies, but is somewhat useful. The number of branches of the second and last anal veins, is also helpful, but rarely dependable. The length of the union of radial sector and medius has also been used, but too variable for a generic character.

### PALPI.

The palpi in *Pteronarcys, Perla, Acroneuria* are short and inconspicuous, the last joint of the maxillary palpi very small, the third somewhat swollen at tip; in *Isogenus,* the fourth joint is longer, and in some species (*nona, ebria,* etc.) the palpi are much longer and more slender, the fourth joint prominent and the third joint not swollen at tip, while in *Alloperla* the last joint is very short, scarcely noticeable.

### SETÆ.

The setæ, or tails, in the primitive forms (*Perla, Acroneuria, Peltoperla*) are short and in *Perla* and *Acroneuria* much thickened at the base and taper to the slender tip. The first few joints in *Perla* are simple annulations, not real joints; in *Acroneuria* they are usually more like a joint, plainly separated by a notch on the side; in *Peltoperla* some species are similar to *Perla,* in others more distinct. Also in *Perlodes,* and *Hydroperla* some species have short setæ, the basal joints scarcely separated. But in most Perlidæ the setæ are long, often as long as abdomen, and with many joints much longer than broad, and with long erect bristles near tip of each joint.

### RESULTS.

On considering these characters in the various genera one sees that there are two primary trends or groups of primitive Perlidæ, one the *Acroneuria* group distinguished by the oblique anal brace arising from near third anal vein, the other the *Isogenus* group with an anal brace arising from the base or near base of anal cell and extended transversely across anal area and anal lobe when present. In the specialization that occurs in both lines, there comes reduction in venation, reduction in anal lobe, and many modifications that will be of use in the particular group.

Both groups have a fringe of hair on lower edge of the femora, in *Perlodes* and *Isogenus* very fine and evenly short, in *Acroneuria* more dense and with some stiffer and longer bristles. Both groups have the basal antennal joints very short, but in each line they become longer in more recent genera. In both lines the anal brace gradually weakens and disappears. In the *Acroneuria* line there is more tendency to retain and develop the bristles; but bristles appear in some of the fairly primitive genera of the *Isogenus* line, such as *Calliperla* and *Diploperla;* but in the more specialized forms (*Isoperla*) the bristles disappear, while in the most specialized group (Chloroperlinæ) of the *Acroneuria* line the bristles are most highly developed.

With the numerous similarities, as well as the differences, of structure in the group, it appears to me that in the Plecoptera there are, as Newman in 1853 stated, but three families, Pteronarcidæ, Perlidæ, and Nemouridæ, and that under the Perlidæ are eleven subfamilies, which are tabulated below.

Two courses are open in making a key to the subfamilies. In both *Isoperla* and *Alloperla* the forking of the cubitus in fore-wings is such that the upper branch of cubitus goes out straight as a continuation of the stem, while the lower branch (cubital fork) plainly diverges from the stem and upper branch of cubitus. In all other Perlidæ the forking of cubitus is so that the upper branch diverges from the stem, plainly at least a little. But the Isoperlinæ and the Chloroperlinæ (*Alloperla*) differ in so many ways, and, as I believe, the Isoperlinæ are an offshoot of the Isogeninæ that I think it better to take out the Chloroperlinæ much before the Isoperlinæ.

Another matter permits of two solutions. Whether to put together all those forms which have femoral bristles, or to dispose of them according to the forking of the cubitus; I have chosen the latter course. Bristles are ancestral, and the occurrence of ancestral characters in descendants is not unusual.

I had started this paper in order to do identification, especially of New England Perlidæ, and had hoped to rely chiefly on body characters, but find (as others have) that there is much in the wing, particularly the basal portion that is sufficiently constant for synoptic purposes. I do not underrate male genitalia and am pleased to find that in general my results agree with the plan made by Ricker in 1943.

### Table to the Subfamilies of the Perlidæ

1. Head longer than broad, eyes situate more than twice their diameter from hind margin; in the forking of cubitus the upper branch is bent a little from the stem; the third anal vein arises from the cell; no anal lobe nor anal brace; antennæ with a few joints near base short; a carina or line connecting eyes and passing just behind hind ocelli. Kathroperlinæ
   If head is longer than broad the eyes are not more than one and one-half diameter from the hind margin ........ 2
2. Small forms less than an inch; no anal lobe nor brace; anal area of hind wings with not more than four longitudinal veins; distinct erect bristles in a row on each side of femoral groove; occipital line absent or indistinct; antennæ rather long, not thickened at base, the joints moniliform; usually in the fore wings the third anal vein branches from the second beyond the anal cell .......... Chloroperlinæ
   Anal area of hind wings with more than four longitudinal veins; in the fore wings the third anal vein leaves the second at or before end of anal cell ...... 3
3. But two ocelli ........ 4
   With three ocelli ........ 6
4. Head about twice as broad as long, partly under the overhanging pronotum, latter very broad, rounded behind, straight or slightly concave in front; legs

short; setæ very short, but basal joints distinct; costal cross-veins numerous ........ Peltoperlinæ

Head usually longer; pronotum usually a little convex in front; setæ not especially short ........ 5

5. Ocelli hardly three diameters apart; anal brace distinct, extending obliquely back; femora with bristles among the hairs, no cross-veins between first and second anal veins ........ Neoperlinæ

Ocelli fully four diameters apart; anal brace faint or absent, usually a few cross-veins between first and second anal veins ........ *Atoperla* in Perlestinæ

6. In fore-wings there is an obliquely recurrent anal brace, often arising near base of third anal vein. Third antennal joint not or little longer than the fourth joint; cubito-anal cross-vein usually at or before end of anal cell; lower edge of femora with fine hairs and some longer bristles ........ 7

In fore wings the anal brace, if present, arises from nearer the base of the anal cell, and extends transversely across anal area and anal lobe (if present); often anal brace faint or absent. Third antennal joint much longer than broad, and sometimes narrowed in middle; cubito-anal cross-vein frequently beyond end of anal cell, and first anal vein may be bent at that point. The lower edge of femora has a row of fine, usually short hairs, but sometimes with longer bristles present ........ 9

7. Setæ fairly long, not noticeably thick near base, the joints soon as long as broad, the fourth not several times as broad as long, often with long erect bristles at tip of joints; wings with few, if any, cross-veins beyond the cord; sometimes a few cross-veins in anal area; in male the genitalia are not visible from above ........ Perlestinæ

Setæ fairly short, thickened at base, the first few joints usually three or four times as broad as long, and not notched at base; usually a number of joints of antennæ toward base much broader than long ........ 8

8. Radial sector beyond cord usually forks three times,

and the forks slope behind the sector, so sector fairly parallel to radius; usually some cross-veins beyond the cord; last joint of maxillary palpi usually one-half of fourth joint. In male no process or extension of fifth dorsal segment, but on ninth ventral segment is a raised median disc; subcosta often ends beyond cord .......... Acroneurinæ

Radial sector usually with but two forks and the first parts into an anterior as well as posterior branch; no series of cross-veins beyond cord, subcosta often ends before or at cord; last joint of maxillary palpi usually not one-half of fourth joint. In male the fifth segment is usually extended, and the genital prongs wholly visible from above, no median disc on the ninth ventral segment .. Perlinæ

9. Both wings with cross-veins beyond the cord forming several irregular cells; the portion of fore wing beyond cord rarely a third of wing-length; the cubito-anal cross-vein is well beyond the end of anal cell; ocellar triangle usually as long as broad; anal lobe distinct and quite long .......... Perlodinæ

Wings rarely with cross-veins beyond the cord, and not forming several cells; portion of fore wing beyond cord usually fully one-third of wing-length .......... 10

10. In the forking of the cubitus in the fore wing the upper branch bends a little upward at the forking, while the lower branch also bends down a little, rarely in a curve or else does not bend at all. Radial sector often forks two or more times. Often with more than one cubital cross-vein in hind wings; cubito-anal vein sometimes broken .......... 11

In the forking of the cubitus, it is the upper branch which continues the straight course, and the lower one diverges usually in a curve. Radial sector rarely forks more than once, and usually but one cubital cross-vein in the hind wings. The fourth joint of antennæ is usually as long as broad, and the sense-hairs distinct; median groove rarely present; cubito-anal vein normally not broken. Isoperlinæ

11. Femora with bristles below among the shorter hairs; anal lobe very small .......................................... Calliperlinæ
Femora with only the fringe of short hairs below. Isogeninæ

### Review of Subfamilies and Genera

### Subfamily Perlodinæ

Hanson has arranged the species of this subfamily on sternal structure, and, I believe, is continuing his work, so I have not utilized sternal structure in this paper, although I have previously (1938) based a genus, *Hesperoperla,* on such characters, and in fact have called attention to the value of ventral structure many years ago (1900).

The only point I would make is that I think his *Dictyoperygella washingtoniana* belongs to the Isogeninæ, close to or the same as *Hydroperla;* and add a new genus, differing from *Perlodes* in the presence of bristles on the femora.

### **Perliphanes** gen. nov.

Type: *Dictyogenus* (?) *phaleratus* Smith.

Head plainly broader than long; ocellar triangle a little broader than long, hind ocelli rather small, looking laterally, nearer to each other than to eyes; median groove reaching occipital line; palpi rather short, third joint thick, longer than fourth, last joint one-half of fourth; pronotum twice as broad as long, sides parallel, as also front and rear sides; setæ short, several joints beyond first broader than long. Wings with some cross-veins connecting branches of radial sector, thus forming cells much like *Perlodes.* Upper branch of cubitus bends at the forking; cubito-anal vein at end of anal cell, first anal vein not here angled; anal lobe does not reach lower end of anal cell; a transverse brace across anal area from near base of anal cell. The femora have bristles among the shorter hairs.

### Subfamily Calliperlinæ

Cubito-anal vein at or near end of anal cell; the first anal vein not angled or scarcely so near base; femora have distinct bristles among the shorter hairs.

1. Pronotum in front fully twice as broad as long; head extending back of eyes for the length of an eye; ocellar triangle twice as broad as long; last joint of maxillary palpi very short; radial sector forked twice ........ *Calliperla*
   Pronotum not so broad, head not extended so far back, ocellar triangle rarely twice as broad as long ........ 2
2. Maxillary palpi long and slender, the joints not broadened at tip; radial sector usually forks twice. *Diploperla*
   Maxillary palpi shorter, one or two joints plainly thickened near tip; radial sector often forked but once ........ *Occiperla*

### **Calliperla** gen. nov.

Type: *Perla luctuosa* Bks.

The ocellar triangle is twice as broad as long; hind ocelli nearer to eyes than to each other, head curving back of eyes more than length of eye. Ocellar line angulate behind, the median groove very short. Palpi very long and slender. Femora with distinct longer bristles besides the short fringe. Pronotum more than twice as broad as long. In fore wing the subcosta ends at or near cord, radial sector usually forks twice, cubito-anal cross-vein at end of anal cell, first anal vein not angled; in hind wing several cubital cross-veins. From base of anal cell in fore wings there is short, transverse anal brace, but no anal lobe; antennæ with several joints beyond the third much broader than long, with only minute erect hairs.

### *Diploperla* Frison

This genus is based on *D.* (*Perla*) *bilobata* N. & C. This is a rather slender species in which the male shows a lobe on two ventral segments (*D. duplicata* is similar). The other forms are rather more robust, and the male has but one ventral lobe. But for the present I will keep them together; they are *modesta, verticalis, nona, tincta, sorpta* and probably *misnoma, alameda, æstivalis,* and *fulva.*

### **Occiperla** gen. nov.

Type: *Isoperla pinta* Frison.

Head broad, behind eyes it at once slopes inward; median groove well developed; ocelli small, lateral boss about as far from hind ocellus as from base of antenna; femora with bristles among the shorter hairs; maxillary palpi moderately short, second and third joints rather thick, fifth long and slender; antennæ with moderately long joints, short hair, and minute sense hair near end of joint; pronotum much broader than long; cubito-anal cross-vein at end of anal cell; cubitus forks so both branches are at an angle with the base; anal brace arising a little before base of anal cell, transverse, no distinct anal lobe.

I have *Occiperla pinta* from Huntington, B. Col., and Cowichan Lake, Vancouver; there are at least two other species in the West, both with the area in front of anterior ocellus wholly yellowish, one with a pale longitudinal streak in the ocellar area, the other with ocellar area covered by a triangular dark spot.

### Subfamily Isogeninæ

1. The anal lobe fairly large and long, ending beyond the lower end of anal cell; in hind wings a series of cubital cross-veins; moderately large specimens ...... 2

   The anal lobe very small or absent, and if present it ends before the lower end of anal cell; usually smaller species ...... 3

2. Ocellar area about as broad as long, or nearly so; head extending some distance behind eyes and plainly a little swollen before sloping inward; median groove nearly or quite reaching occipital line ...... *Isogenus*

   Ocellar area but little if any broader than long; head very short behind eyes, scarcely space for more than the inward slope; median groove not reaching the occipital line ...... *Hydroperla*

3. Hind ocelli far from hind border of head, not under a ridge, nor a shallow groove reaching laterally, but projecting a bit above surface, anterior ocellus almost as near each eye as to anterior margin of

head; fourth antennal joint fully as long as broad. *Megahelus*

Hind ocelli not so far from hind border of head and looking out over a broad shallow groove toward eye or antennæ; anterior ocellus much farther from either eye than from anterior border of head .......... 4

4. Ocellar area about twice as broad as long; median groove complete and distinct; wings moderately broad ........................................ *Pictetia*

Ocellar area plainly not twice as broad as long; median groove sometimes complete, often not, wings not so broad ........................................ *Clioperla*

### *Clioperla* N. & C.

This genus, proposed by Needham and Claassen, is based on the *Isogenus clio* Newman. Through the kindness of Mr. Kimmins of the British Museum I have learned of the generic characters which places the genus in the above table. The type is from Georgia, N. & C. identified specimens from North Carolina and Indiana. I have not been able to see these specimens; Frison saw them and said[3] that the specimens from Raleigh, N. C., are the same as his *confusa*. Specimens sent, as paratypes of *confusa*, by Frison to the M.C.Z. are very different from *clio*. In the M.C.Z. are two specimens from Woodworth Lake, Fulton Co., N. Y., which agree with color description I made of the type in 1912. The species is very close, perhaps the same, as that later described by Pictet as *Perla maculata*. Specimens that I have identified as *maculata* are from North Carolina and the White Mts., N. H.; these are smaller than *clio* and the tip of abdomen yellow, and the subgenital plate less strongly rounded.

### **Pictetia** gen. nov.

Type: *Perla expansa* Bks.

The anal lobe is very small and short, the brace scarcely distinct; cubito-anal vein beyond tip of anal cell; palpi long and slender; back of eyes the head slopes inward.

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[3] Bull. Ill. Nat. Hist. Survey 22: 331. 1942.

### *Isogenus* Newm.

This remains as used in Needham & Claassen.

### *Hydroperla* Frison

This includes besides the species mentioned by Frison, *varians, subvarians, hastata, guerini.*

### *Megahelus* Klap.

This is based on *Isoperla bellona* Bks.; it has much resemblance to typical Isoperla, but the cubitus forks as in *Isogenus.* There are apparently one or two more species.

### Subfamily Isoperlinæ

1. Hind ocelli almost twice as near eyes as to each other, ocellar triangle fully twice as broad as long; pronotum plainly more than twice as broad as long; spines under tibiæ stout and long; small black species ........ *Nanoperla*
   Hind ocelli not so near to eyes, and ocellar triangle not so broad ........ 2
2. Femora with distinct longer bristles among the shorter hair; cubito-anal cross-vein at end of the anal cell ........ *Perliola*
   Femora with only the fringe of short, even hairs ........ 3
3. Hind ocelli looking laterally out over a broad, shallow groove toward eye or antenna; inner edge of ocelli scarcely above the middle surface; mostly more or less marked with brown; sometimes with extra cubital cross-veins in hind wing ........ *Walshiola*
   Hind ocelli looking more upward, inner edge usually a little above surface between ocelli; no shallow groove, at most a small, subtriangular pit just outside of ocellus; mostly pale species; rarely with extra cross-veins in cubital area of hind wings. *Isoperla*

### *Isoperla* Bks.

This I reduce to the forms similar to the genotype (*bilineata*) in having the cubitus forked so that the upper branch is continuous and the lower branch arising from it at an angle or a curve; and further as in the above table. This is closely similar to the condition in *Alloperla.*

### **Nanoperla** gen. nov.

Type: *Chloroperla minuta* Bks.

This was placed in *Isoperla* by Needham and Claassen and by Frison. It differs from *Isoperla* by the more widely separated posterior ocelli, fully twice as far apart as each from eye; by the lack of an angle at anterior corners of the pronotum; in the hind wing the median cell is fully twice as long as its pedicel; the legs and setæ are shorter; the medius of fore wing is often stopped by the first median cross-vein, and does not extend basally close to the radius as is common in Perlidæ, this is similar to *Hastaperla* and *Chloroperla;* in the anal area the third anal vein usually branches from the second at the end of anal cell, sometimes a little beyond, rarely before it. Its dark fore wings with the costal area yellowish also separates it from Isoperla. In both sexes the genitalia are different from the normal Isoperla.

*Nanoperla minuta* occurs in the mid-western States, Ohio, Michigan, Illinois. It may be, as Frison suggests, that it is the *Chloroperla nana* Walsh. His description is short, and the size is a little large for a dried specimen; his unique type was from Rock Island, Illinois; Frison says that *minuta* occurs in the central and eastern part of Illinois.

### **Walshiola** gen. nov.

Type: *Perlinella signata* Bks.

In Isoperlinæ, the upper branch of cubitus continues the line of the base; cubito-anal at tip of anal cell or a little beyond; radial sector forked once or twice; the head back of eyes at once curves inward; median groove usually reaches the occipital line, which, beyond each ocellus fades; hind ocelli looking out laterally over a broad, shallow groove; ocellar triangle a little broader than long; a rather wide space between arms of the V-mark; fourth antennal joint about or fully as long as broad; palpi long and slender, fourth joint rather longer than third.

Contains also *montana* Bks. and *marlynia* N. & C.

### **Perliola** gen. nov.

Type: *Isoperla 5-punctata* Bks.

In this the cubitus forks as in typical *Isoperla,* but the femora are usually thicker (front pair) and with more numerous hairs and among them longer bristles; the ocelli are small, the lateral boss about as large and almost as far from hind ocellus as from the base of antenna; median groove present and usually visible. The maxillary palpi are short, the second and third joints at least rather thick; the joints of antennæ though much longer than broad are not as long as in *Isoperla,* and the hair is usually shorter. There are several species in the Western States, one with much resemblance in subgenital plate to *Isoperla sobria* Hag.

### Subfamily Perlestinæ

The three genera in our fauna are separable as follows.

1. A series of costal cross-veins (five to ten or more) before end of subcosta; head broader behind than long; no cross-veins connecting anal veins beyond cell; three ocelli; first anal ends before origin of radial sector ........ *Perlesta*

   First anal vein usually ends about as far out as origin of radial sector; rarely more than one or two costal cross-veins before end of subcosta; head sometimes as long as broad; often one or more cross-veins in anal field ........ 2

2. With but two distinct ocelli; rarely with more than one or two cross-veins between first and second anal veins; front femora about equal to width of pronotum ........ *Atoperla*

   With three ocelli; usually three or more cross-veins connecting first and second anals; front femora not as long as width of pronotum ........ *Perlinella*

### Subfamily Neoperlinæ

There is but one genus, *Neoperla,* in the U. S., others with many species occur in tropical areas and in East Asia.

### Subfamily Acroneurinæ

The numerous species of this subfamily are placed in *Acroneuria, Claassenia, Eccoptura, Beloneuria,* and *Hesperoperla.*

### Subfamily Perlinæ

The few genera, *Perla, Togoperla, Banksiana, Harrisiola,* have been separated by Klapalek and others; it is necessary to distinguish the female of *Harrisiola* from *Perla* (*Togoperla*). In *Harrisiola* (both sexes) the occipital line ends on the outer end of the lateral boss, in *Perla* the line does not bend forward so far, but runs toward the eye, well behind the boss. *Perla* has a tiny last joint to maxillary palpi.

### Subfamily Kathroperlinæ

We have in America but the typical genus which occurs in British Colombia and adjacent areas. There are other genera in Formosa and China.

### Subfamily Chloroperlinæ

The four genera, *Paraperla, Alloperla, Chloroperla,* and *Hastaperla,* were tabulated by Frison in 1942.

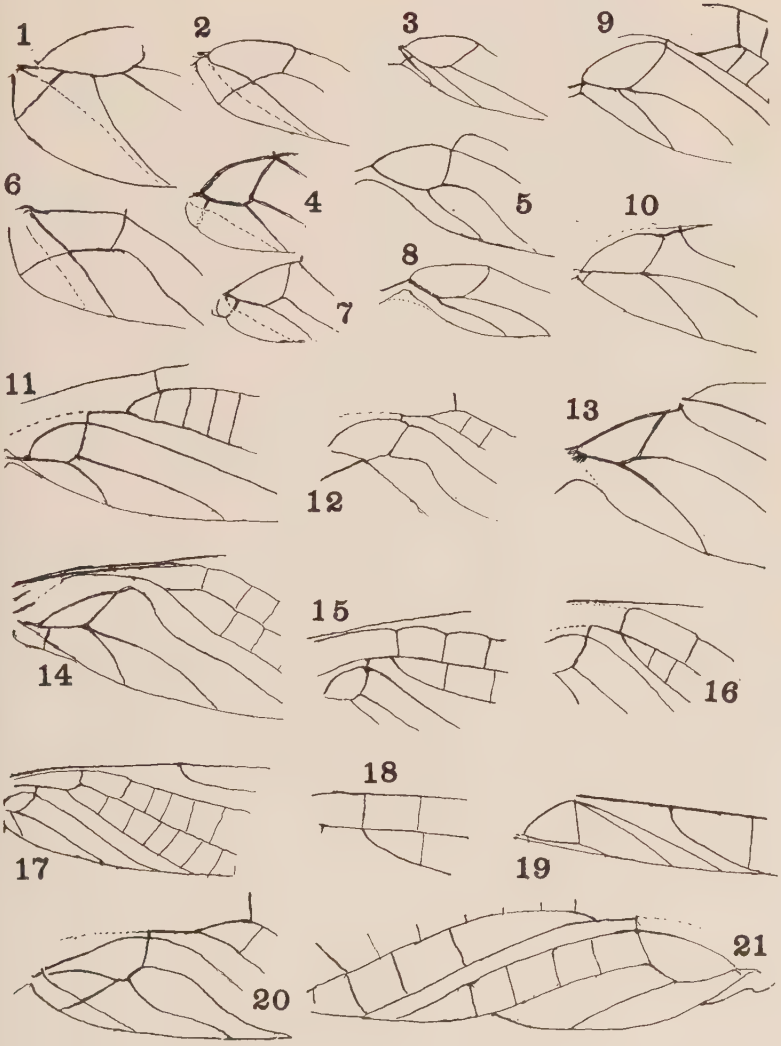
### Subfamily Peltoperlinæ

So far all the forms have been kept in the one genus *Peltoperla,* but *P. cora* will doubtless become at least a subgenus.

## Explanation of Plate 20

Fig. 1. *Pteronarcys spinosa*, anal part of fore wing.
Fig. 2. *Harrisiola flavescens*, anal part of fore wing.
Fig. 3. *Clioperla ebria*, anal part of fore wing.
Fig. 4. *Perlodes signata*, anal part of fore wing.
Fig. 5. *Peltoperla maria*, anal part of fore wing.
Fig. 6. *Acroneuria lycorias*, anal part of fore wing.
Fig. 7. *Isogenus frontalis*, anal part of fore wing.
Fig. 8. *Walshiola montana*, anal part of fore wing.
Fig. 9. *Kathroperla perdita*, anal part of fore wing.
Fig. 10. *Diploperla*, anal part of fore wing.
Fig. 11. *Clioperla similis*, basal part of fore wing.
Fig. 12. *Banksiana kansensis*, anal part of fore wing.
Fig. 13. *Pictetia expansa*, anal part of fore wing.
Fig. 14. *Hydroperla subvarians*, basal part of fore wing.
Fig. 15. *Isoperla bilineata*, anal part of fore wing.
Fig. 16. *Isoperla transmarina*, anal part of fore wing.
Fig. 17. *Diploperla bilobata*, basal part of fore wing.
Fig. 18. *Perliola 5-punctata*, forking of cubitus.
Fig. 19. *Hastaperla brevis*, anal part of fore wing.
Fig. 20. *Togoperla immarginata*, basal part of fore wing.
Fig. 21. *Atoperla fumipennis*, basal part of fore wing.

Psyche, 1947 Vol. 54, Plate 20

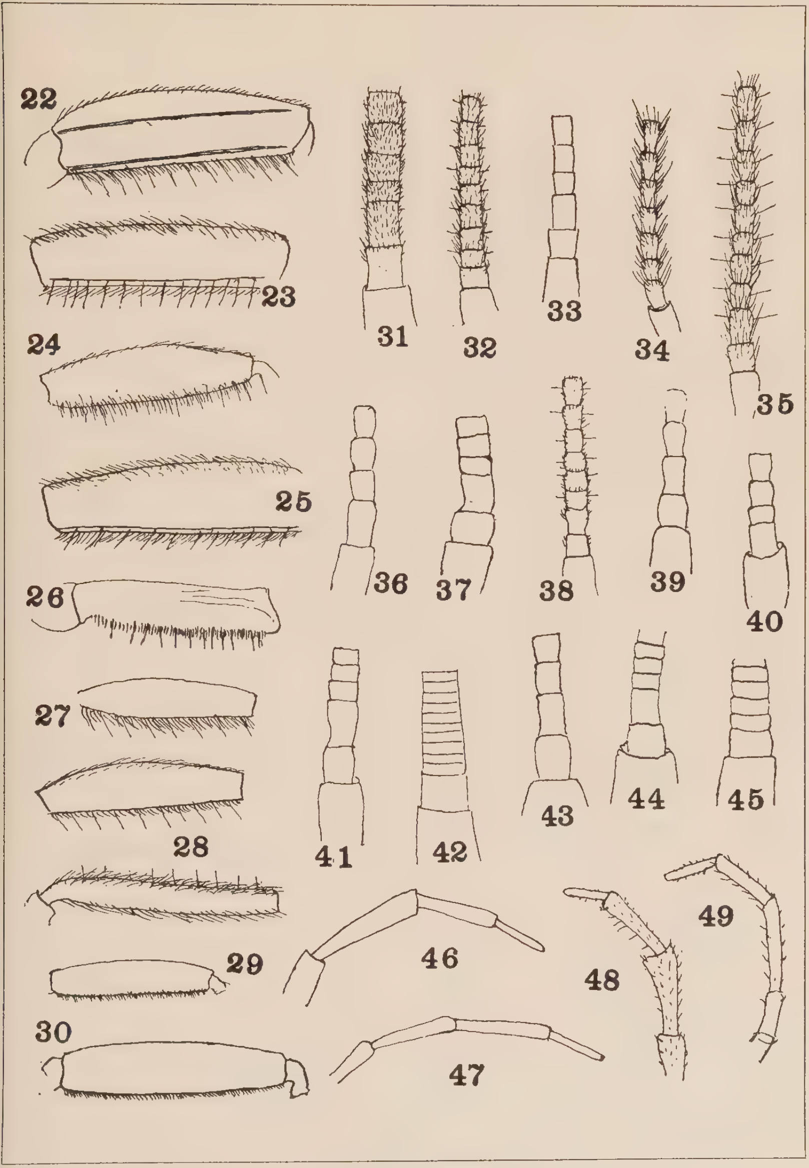


Banks—Perlidæ

## Explanation of Plate 21

Fig. 22. *Perliphanes,* femur.
Fig. 23. *Calliperla,* femur.
Fig. 24. *Diploperla bilobata,* femur.
Fig. 25. *Togoperla immarginata,* femur.
Fig. 26. *Occiperla* sp., femur.
Fig. 27. *Hastaperla brevis,* femur.
Fig. 28. *Alloperla imbecilla,* femur and tibia.
Fig. 29. *Isoperla,* femur.
Fig. 30. *Hydroperla,* femur.
Fig. 31. *Isogenus,* basal portion of antenna.
Fig. 32. *Perlesta,* basal portion of antenna.
Fig. 33. *Isoperla bilineata,* basal part of antenna.
Fig. 34. *Hastaperla,* basal part of antenna.
Fig. 35. *Alloperla,* basal part of antenna.
Fig. 36. *Isoperla? mohri?,* basal part of antenna.
Fig. 37. *Diploperla modesta,* basal part of antenna.
Fig. 38. *Walshiola montana,* basal part of antenna.
Fig. 39. *Megahelus bellona,* basal part of antenna.
Fig. 40. *Neoperla clymene,* basal part of antenna.
Fig. 41. *Perlodes signata,* basal part of antenna.
Fig. 42. *Acroneuria,* basal part of antenna.
Fig. 43. *Clioperla maculata,* basal part of antenna.
Fig. 44. *Calliperla luctuosa,* basal part of antenna.
Fig. 45. *Perla* and *Togoperla,* basal part of antenna.
Fig. 46. *Isogenus frontalis,* maxillary palpus.
Fig. 47. *Diploperla bilobata,* maxillary palpus.
Fig. 48. *Perliola 5-punctata,* maxillary palpus.
Fig. 49. *Clioperla ebria,* maxillary palpus.

Psyche, 1947 Vol. 54, Plate 21

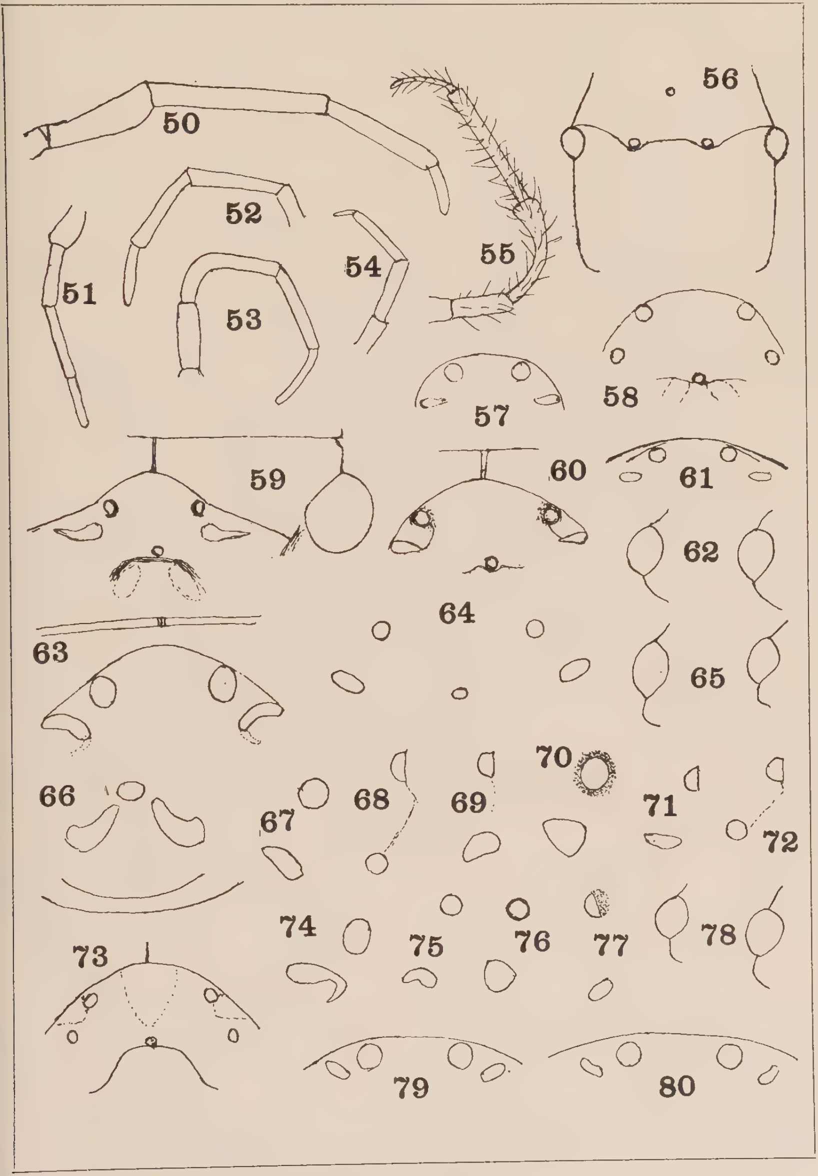


Banks—Perlidæ

## Explanation of Plate 22

Fig. 50. *Togoperla immarginata,* maxillary palpus.
Fig. 51. *Peltoperla maria,* maxillary palpus.
Fig. 52. *Isoperla bilineata,* maxillary palpus.
Fig. 53. *Harrisiola flavescens,* maxillary palpus.
Fig. 54. *Alloperla coloradensis,* maxillary palpus.
Fig. 55. *Perlesta,* maxillary palpus.
Fig. 56. *Kathroperla,* head.
Fig. 57. *Harrisiola,* ocellar area.
Fig. 58. *Perliola 5-punctata,* ocellar area.
Fig. 59. *Hydroperla hastata,* ocellar area.
Fig. 60. *Isogenus frontalis,* ocellar area.
Fig. 61. *Perla capitata,* ocellar area.
Fig. 62. *Walshiola marlynia,* (left) *Diploperla modesta,* (right) eye and side of head.
Fig. 63. *Togoperla immarginata,* ocellar area.
Fig. 64. *Calliperla luctuosa,* ocellar area.
Fig. 65. *Perlodes* (left), *Isogenus* (right), eye and side of head.
Fig. 66. *Togoperla immarginata,* lower face.
Fig. 67. *Acroneuria californica,* ocellus and boss.
Fig. 68. *Diploperla misnoma?,* ocellus and boss.
Fig. 69. *Atoperla ephyre,* ocellus and boss.
Fig. 70. *Neoperla clymene,* ocellus and boss.
Fig. 71. *Megahelus bellona,* ocellus and boss.
Fig. 72. *Clioperla maculata,* ocellus and boss.
Fig. 73. *Walshiola signata,* ocellar area.
Fig. 74. *Togoperla immarginata,* ocellus and boss.
Fig. 75. *Walshiola montana,* ocellus and boss.
Fig. 76. *Peltoperla arcuata,* ocellus and boss.
Fig. 77. *Alloperla borealis,* ocellus and boss.
Fig. 78. *Clioperla ebria* (left), *Perlinella drymo* (right), eye and side of head.
Fig. 79. *Eccoptura xanthenes,* ocellar area.
Fig. 80. *Acroneuria carolinensis,* ocellar area.

PSYCHE, 1947 VOL. 54, PLATE 22



BANKS—PERLIDÆ

# PSYCHE

## INDEX TO VOL. 54, 1947

---

### INDEX TO AUTHORS

Anastos, G. Hosts of Certain New York Ticks. 178

Bailey, N. S. Field Notes on *Tabanus nigrovittatus* Macquart. 62
*Trichopria tabanivora* Fouts in Massachusetts (Hymenoptera, Diapriidæ). 142

Banks, N. Synopsis of West Coast *Cerceris* (Hymenoptera, Cerceridæ). 1
On Some Acarina from North Carolina. 110
Some Characters in the Perlidæ. 266

Bequaert, J. C. Catalogue of Recent and Fossil Nemestrinidæ of America North of Mexico. 194

Briscoe, M. S. Insect Reconnaissance in Liberia, West Africa. 246

Brown, W. L., Jr. A New *Stictoponera,* with Notes on the Genus (Hymenoptera: Formicidæ). 263

Brues, C. T. Habitat of *Ænigmatias* (Diptera: Phoridæ). 265

Bryant, E. B. A List of Spiders from Mona Island, with Descriptions of New and Little Known Species. 85
Notes on Spiders from Puerto Rico. 183

Carpenter, F. M. Early Insect Life. 65
Taxonomic Notes on the Dilaridæ (Neuroptera). 100

Christiansen, K. A. A New Genus and Species of Damselfly from Southern Haiti (Odonata). 256

Denning, D. G. New Species and Records of North American Hydroptilidæ (Trichoptera). 170

Frost, C. A. Sphindidæ and Cisidæ (Coleoptera). 180

Gurney, A. B. Notes on Dilaridæ and Berothidæ, with Special Reference to the Immature Stages of the Nearctic Genera (Neuroptera). 145

Hoff, C. C. New Species of Diplosphyronid Pseudoscorpions from Australia. 36

Hull, F. M. An Interesting Oceanic Species of *Cerioides* (Diptera: Syrphidæ). 181
Some American Syrphid Flies. 230

Silvestri, F. On Some Japygidæ in the Museum of Comparative Zoölogy (Dicellura). 209

Werner, F. G. A Note on the Type Specimen of *Bagous sellatus* Leconte (Coleop., Curculionidæ). 262

Wind, R. G., and H. K. Clench. The Genus *Callictita* (Lepidoptera, Lycænidæ). 57

### INDEX TO SUBJECTS

All new genera, new species and new names are printed in LARGE AND SMALL CAPITAL TYPE.

Acarina from North Carolina, 110
*Ænigmatias,* 265
*Agobardus* BLANDUS, 187
A List of Spiders from Mona Island, with Descriptions of New and Little Known Species, 86
ALLODAMÆUS EWINGI, 119
ALLODIPŒNA DIANÆ, 184
ALLORIBATES SINGULARIS, 113
A New Genus and Species of Damselfly from Southern Haiti (Odonata), 256

A New *Stictoponera*, with Notes on the Genus (Hymenoptera: Formicidæ), 263
An Interesting Oceanic Species of *Cerioides* (Diptera; Syrphidæ), 181

*Baccha* BALBOA, 230
*Baccha* CYBELE, 236
*Baccha* DUIDA, 238
*Baccha* URSULA, 234
*Baccha* ZEPHYREA, 232
*Bagous sellatus*, 262
*Belba* INÆQUIPES, 121
Berothidæ, 145
Blattaria, 80
Book Notice, 143

*Caledonomorpha* MILNEANA, 241
*Callictita*, 57
*Callictita cyara* ARFAKIANA, 60
CALLIPERLA, 279
Caloneurodea, 77
*Caraboides* RETRACTA, 123
Catalogue of Recent and Fossil Nemestrinidæ of America North of Mexico, 194
*Cerceris*, 1
*Cerceris* ARIZONELLA, 32
*Cerceris* ARNO, 19
*Cerceris* ATHENE, 20
*Cerceris* CALODERA, 22
*Cerceris* ENGLEHARDTI, 12
*Cerceris* EURYMELE, 11
*Cerceris* HUACHUCA, 29
*Cerceris* ILLOTA, 23
*Cerceris* ISOLDE, 24
*Cerceris* MELANTHE, 21
*Cerceris* ORESTES, 13
*Cerceris* ORPHNE, 15
*Cerceris* SEMIATRA, 25
*Cerceris* SEMINIGRA, 33
*Cerceris* SEXTOIDES, 10
*Cerceris* THIONE, 18
*Cerceris* VIERECKI, 30
*Cerioides* WILLIAMSI, 181
Cisidæ, 180
Coleoptera, 84
Corrodentia, 81

Damselfly from Southern Haiti, 256
Dilaridæ, 100, 145

Early Insect Life, 65
Eighth International Congress of Entomology, 208
Ephemerida, 81
*Epilohmannia* ELONGATA, 127
*Eremæus* POLITUS, 126
*Erythræus* CAROLINUS, 111
*Erythræus* EXILIPES, 110
*Evalljapyx* DARLINGTONI, 219
*Evalljapyx dispar*, 217
*Evalljapyx sonoranus*, 214

Field Notes on *Tabanus nigrovittatus* Macquart, 62
Fossil Nemestrinidæ, 194

*Garypus* LONGIDIGITUS, 41
*Gymnodamæus* MINOR, 117
*Gymnodamæus* PEARSEI, 116

*Habronattus* PRETIOSUS, 189
Hemiptera, 82
*Hirmoneura*, 196, 205
Hosts of Certain New York Ticks, 178
*Hydroptila* ACOMA, 175
*Hydroptila* VALHALLA, 175
Hydroptilidæ, 170

Insect Reconnaissance in Liberia, 246

JACOTELLA, 115
JAPYGIANUS WHEELERI, 222
Japygidæ, 209

Liberia, Insect Reconnaissance in, 246
*Lohmannia* BREVIPES, 128
*Lomamyia*, 152

Mecoptera, 83
Megasecoptera, 73
*Metajapyx* CONFECTUS, 212
*Metajapyx subterraneus*, 209
*Minunthozetes* ANGUSTA, 114

*Nallachius*, 101, 146
*Nallachius* REDUCTUS, 104
NANOPERLA, 283
Nemestrinidæ, 194
NEODILAR *hermosa*, 108
*Neorhynchocephalus*, 199, 205
Neuroptera, 83
New Species and Records of North American Hydroptilidæ (Trichoptera), 179
New Species of Diplosphyronid Pseudoscorpions from Australia, 36
New York Ticks, 178

Note on the Type Specimen of *Bagous sellatus* Leconte (Coleoptera: Curculionidæ), 262
Notes on Dilaridæ and Berothidæ, with Special Reference to the Immature Stages of the Nearctic Genera (Neuroptera), 145
Notes on Spiders from Puerto Rico, 183

OCCIPERLA, 280
Oceanic Species of *Cerioides*, 181
Odonata, 81
*Olpium* ZEALANDIENSIS, 36
On Some Acarina from North Carolina, 110
On Some Japygidæ in the Museum of Comparative Zoölogy (Dicellura), 209
*Oribata* CAROLINENSIS, 119
*Oribata* DIVERSIPES, 120
*Oribatella* CAROLINA, 112
*Oxyethira* OBTATUS, 171

Palæodictyoptera, 71
Perlaria, 84
Perlidæ, 266
PERLIOLA, 284
PERLIPHANES, 278
PHYLOLESTES ETHELÆ, 258
PICTETIA, 281
*Prosœca*, 206
Protelytroptera, 79
*Prothyma* PAPUA, 242
Protodonata, 74
Protohemiptera, 75
Protoperlaria, 78
Protorthoptera, 76
Pseudoscorpions, 36

*Rhinoprosopa* SYCORAX, 239
*Rhynchocephalus*, 203

*Sidusa* MONA, 95
Some American Syrphid Flies, 230
Some Characters in the Perlidæ, 266
Sphindidæ, 180
Spiders from Mona Island, 86
Spiders from Puerto Rico, 183
*Stictoponera menadensis*, 264
*Stictoponera* PANDA, 263
*Stoides* PLACIDA, 94
Synopsis of West Coast *Cerceris* (Hymenoptera, Cerceridæ), 1
*Synsphyronus* CALLUS, 50
*Synsphyronus* MAGNUS, 47
*Synsphyronus* NIGER, 45
Syrphid Flies, 230

*Tabanus nigrovittatus*, 62
Taxonomic Notes on the Dilaridæ (Neuroptera), 100
*Tetragnatha* PARVA, 186
The Genus *Callictita* (Lepidoptera, Lycænidæ), 57
The Habitat of *Ænigmatias* (Diptera: Phoridæ), 265
*Theridion* INSULICOLA, 88
Thysanoptera, 84
Ticks, 178
Tiger Beetles from New Guinea, 241
*Trichopria tabanivora* Fouts in Massachusetts (Hymenoptera, Diapriidæ), 142
Trichopsidea, 203
Two New Tiger Beetles from New Guinea, 241

WALSHIOLA, 283
*Wixia* SERRALLESI, 90

*Xenillus* OCCULTUS, 125
*Xenolpium* GRANULOSUM, 39

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